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A 2-DAY CONFERENCE WAS HELD AT THE SCHOOL OF LIBRARY SCIENCE, COLUMBIA UNIVERSITY, TO ASSESS THE STATUS OF THE USE OF PRINTED AND AUDIOVISUAL MATERIALS FOR INSTRUCTION, TO ANALYZE STUDIES AND PRACTICE, AND TO STIMULATE THE INTEREST AND PARTICIPATION OF SPECIALISTS IN THE INSTRUCTIONAL MATERIALS AREA. THE FIRST STEP TAKEN WAS TO EXAMINE THE FUNDAMENTAL USES OF THESE MATERIALS AT THREE EDUCATIONAL LEVELS--(1) ELEMENTARY, (2) SECONDARY, AND (3) COLLEGE/UNIVERSITY. THEN THE NUMEROUS AVAILABLE MATERIALS WERE DESCRIBED, ANALYZED, AND EVALUATED ON SEPARATE BASES, INCLUDING (1) GENERAL BOOKS AND TEXTBOOKS, (2) REFERENCE BOOKS, (3) PERIODICALS AND OTHER SERIALS, (4) AUDIOVISUAL MATERIALS, (5) EXHIBITS, MODELS, AND GRAPHIC MATERIALS, AND (6) MOTION PICTURES. ADDITIONAL TOPICS DISCUSSED AT THE CONFERENCE WERE THE INTERACTION OF OTHER MEDIA ON CONVENTIONAL BOOK USE, INSTRUCTION IN THE USE OF LIBRARIES AND LIBRARY USE BY STUDENTS, CHANGING METHODS IN EDUCATIONAL PUBLISHING, AND POSSIBLE APPLICATION OF DOCUMENTATION AND INFORMATION RETRIEVAL FOR INSTRUCTIONAL PURPOSES. A BROAD RECAPITULATION OF RECOMMENDATIONS WAS PREPARED ON EACH OF THE CONFERENCE TOPICS AS THE FINAL EFFORT OF THIS PROGRAM. (JH)

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FINAL REPORT
February 1966

CONFERENCE ON
THE USE OF PRINTED AND AUDIO-VISUAL MATERIALS FOR INSTRUCTIONAL PURPOSES

Prepared by

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Preface

The papers included in this report were prepared originally by the various participants for the two-day meeting, November 22-23, 1965, at the School of Library Service, Columbia University. Early drafts of the papers were later revised by the authors, and special attention was directed at emphasizing the needed programs for future research. In a few areas, there are differences in conclusions on similar topics; these differences reflect the absence of research in the areas involved.

The Director is grateful to the participants and others who have given assistance in the carrying out of the project (OE-5-16-034). To the several staff members at the U.S. Office of Education, which supported the project, he owes a special word of thanks for the many helpful actions necessary in completing the assignment. Special acknowledgment should be made to Dean Jack Dalton, of the School of Library Service, for his many suggestions for the two-day program, and for making arrangements for the Director and his assistants to utilize personnel of the School on various parts of the study. Thanks are due particularly to the following office staff of the School: Mrs. Marilee Martel, Ruth Pelner, Cynthia Kessel, Gail Levine, Jessica Spadola, and Mrs. Donna Duffy.

Dr. Warren F. Goodell, Jr., Associate Director of the Columbia University Office of Projects and Grants, was helpful always in various managerial aspects involved in the study.

To the three teaching staff members who assisted in the development of the program itself, in conducting the meetings, and in editing and in doing bibliographical work connected with the papers, the Director is extremely grateful. Mrs. Irlene Roemer Stephens, Associate in Library Service, assisted with the project from the beginning. She participated in developing the program, selecting participants and editing of the papers, and she prepared the summaries. Miss D. Marie Grieco, Lecturer in Library Service, contributed to the selection of participants, and in the development of material for the summaries. Mr. Richard J. Hyman, Teaching Assistant in Library Service, assisted in revising the bibliographies and helping in other ways. Mr. Abdus Subbuh Qasimi, Teaching Assistant in Library Service, and Miss Elizabeth Pedro, a student in the School of Library Service, aided in preparation of the material for the printer.

February 23, 1966 Maurice F. Tauber, Director

INTRODUCTION

PURPOSE OF THE CONFERENCE

The primary purpose of the Conference was to describe, analyze and evaluate:

(1) the use of printed and audio-visual materials for instruction in:
  (a) elementary schools;
  (b) secondary schools; and
  (c) colleges and universities;
(2) the use, for instructional purposes, of:
  (a) general books, textbooks, encyclopedia and bibliographies;
  (b) reference books;
  (c) periodicals and other serials, newspapers, technical reports, and pamphlets;
  (d) audio-visual materials;
  (e) exhibits, models and graphic materials; and
  (f) motion pictures;
(3) the interaction of other media on conventional book use;
(4) instruction in the use of the library and library use by students;
(5) changing methods in educational publishing; and
(6) possible application of documentation and information retrieval for instructional purposes;

It was decided that a thoroughgoing review by specialists of the present practices and status of research in the indicated areas would provide a basis for projecting future research programs. Particular attention was to be directed toward a description and critical analysis of significant studies, and the research methodologies employed in these studies, so that recommendations for future programs of research could indicate not only the areas in which research is needed, but also suggest methodologies which, when employed in valid studies designed in light of experiences in the past, could be productive of reliable results.

Emphasis should be placed on the fact that it was recognized at the outset that research in the field of the use of printed and audio-visual materials for instructional purposes is relatively infrequent and uncoordinated. Nevertheless, it was considered that the most pragmatic and expeditious approach to providing direction for future research and practice in the use of printed and audio-visual materials for instructional purposes at all levels was to bring together leaders in the field, (including educators, librarians and media specialists), each identifying, assessing and evaluating present practices and studies in the area from his particular point of view, and bringing to bear the theoretical and practiced knowledge, skills and judgment of his particular specialization, thereby providing a climate for integration and synthesis.

It is generally acknowledged that many of the existing studies which have been regarded as research studies in the use of printed and audio-visual materials for instructional purposes might better be described as status or surveys of present practices. Though the strict disciplinarian could reasonably distinguish these studies as non-research, when tied with attempts to evaluate effects through the use of evaluation instruments and techniques, these studies contribute significantly to the understanding of the relative effectiveness of the use of the various media for instructional purposes.

Quite obviously, the objective of research in the use of materials for instructional purposes is to describe the various media used and to analyze the effectiveness of that use in the attainment of educational objectives. Perhaps to expect to distinguish among the various media and determine a percent contribution to this attainment would be not only unreasonable, even with a controlled sample, but, even if it were possible to reliably make this distinction, it is probable that educators would continue to use all media if for no reason other than because of the wide variation among students at all levels. The concept that all of the senses should be involved in learning, and that instruction should avail all approaches to these senses in the instructional process, is sound.

It may be possible only to distinguish between the extent of contribution to the attainment of educational objectives by the instructional use of printed materials as opposed to that of printed materials in combination with the other media, since so much of the instruction in the past, and, indeed, in the present, has employed printed materials, neglecting, in the main, the use of the other media.

In the view of some, "controlled" studies might, then, accept the test results of certain programs of instruction in the past as reflecting the extent of attainment of educational objectives through instruction utilizing printed materials, with comparison to be made to studies in which all of the media were used for instructional purposes. Certainly educators would be guided in approaches to the attainment of educational objectives if a sufficient number of valid and reliable studies were conducted in the various subject fields with students at various levels of intelligence and social adjustment showing the effects on learning, over extended periods of time, with different aptitudes, with different interests, and with different attitutdes, of the use of various educational media, separately and in combination. It is recognized that the extent to which other media are utilized by students outside of the school situation depends upon the accessibility and availability of these materials. Controlled studies of the extent of contribution of the various media to the attainment of educational objectives would, necessarily, detail the utilization of materials of all types by students outside the classroom situation.

Educational research, by its very nature, involves many acknowledged variables, which cannot easily be controlled. It has been considered that the subject matter of the logically organized school subjects may be less well retained than knowledge learned incidentally or functionally in natural life situations. Accordingly, the use of all types of materials by the student outside the classroom situation undoubtedly contributes immeasurably to the attainment of educational objectives and is one variable among students which can be detailed, unlike many other variables which can neither be controlled, nor measured, nor even, in some instances, described.

The intelligence of students is one obvious variable in studies relating to the effect of the various media used for instructional purposes on the extent of attainment of educational objectives. Since, it might be considered that intelligence can be broken down into a collection of functional unities, called primary abilities, it is apparent that even the question of what is a valid intelligence test becomes meaningless, though "intelligence" tests have been "validated". Basic research studies on the effect of various media on the extent of attainment of educational objectives, designed to take into account the variable of the intelligence of the students must recognize the requirement both of factorial and practical validity in the tests used. Quite obviously the measurements applied to the population of the study must be reliable.

USE STUDIES

Use and user studies have been conducted in many areas. Even the most erudite of these, on critical analysis, reflect shortcomings; too often the accumulated information and the generalizations presented can be considered reliable only for the particular sample. However, among meeting the criterion of being based on objective data, rather than on opinions, and of employing valid tests and a reliable set of measurements, there are those which contribute to the understanding of user behavior. In the design of use and users studies, however, there is room for opinions. The educator, knowledgeable in educational media, even without the benefit of studies evaluating effectiveness of various types of materials in attainment of educational objectives, may well give guidance which will be more valuable than the results of user studies.

In 1958, J.D. Bernal assessed the contribution made by use studies and remarked, with respect to information services, that the user may know what he wants but he is in no position to know what he needs. This judgment was shared by the late Mortimer Taube who considered that the user studies are useless, regardless of the area in which they are conducted. Programs of instruction in the substantive fields have been initiated and successfully pursued by leaders in the academic subject fields, experienced in curriculum construction as well as in the use of instructional methods and the psychology of learning. This same integration of the philosophies, experiences and calculated opinions of specialists, not in conclave but systematically involving specialists in education, in librarianship and in educational media on a national basis, might well provide the direction for future research.

Within this context, and consistent with the broad implications of the conference proceedings, it is suggested that the leaders in education, (experienced in curriculum construction, cognizant of the mechanisms in the psychology of learning, and accomplished in the use of instructional methods), well-oriented in the use of all types of materials for instruction purposes, aware of past and present practices and conscious of the effectiveness of the various media, recommend new materials and new combinations of materials studies. Again, it was considered that a review of the use of materials of all types for instructional purposes at the various levels of education, together with a critical evaluation of the research studies on this use, should provide orientation for making recommendations for future research in this field.

To this end, fourteen participants, each outstanding in his own field, were brought together for a closed conference. Extensive outlines and preliminary drafts of papers were prepared and distributed before the Conference to provide a basis for coordinated discussion.

THE OBJECTIVES OF EDUCATION AND INSTRUCTION

It is generally accepted that the most effective fulfillment of the broad objectives of education and instruction, at whatever level of education requires the use of all available types of materials. Perhaps, even in the traditional school where primary emphasis was placed on teaching the three R's, there might have been advantage in using all media for instructional purposes, but surely in attempting to provide experiences which will result in the student's growth in the direction of the broad objectives of education, classified as self-realization, human relationship, economic efficiency and civic responsibility, the use of all media would appear to be the better part of wisdom. Programs of instruction have been evaluated by determining the extent of contribution to these objectives.

Problems both of materials and methods have been encountered in attempts to attain the broad-scope educational objectives striven for by present-day educators and circumscribed by the Educational Policies Commission. Of the objectives categorized as objectives of self-realization (The Inquiring Mind; Speech; Reading, Writing, Numbers; Sight and Hearing; Health Knowledge; Health Habits; Public Health; Recreation; Intellectual Interests; Esthetic Interests; Character), it is apparent that, even today, reading, writing and numbers have been given most attention. The inquiring mind is least emphasized.

Educators today recognize that these objectives are of equal importance. Perhaps the analysis of possible experiences and materials which would contribute to the realization of neglected objectives should be less stereotype. In any event, it is probable that more attention should be directed toward evaluation of the effect of the introduction of new materials of instruction on learning and on the extent to which educational objectives are attained. Effective evaluation instruments and techniques are available in many areas; yet, testing programs are often limited to measurement of certain abilities and knowledges. The controlled experiments, so effectively conducted in chemistry and physics, are not possible, in the strict sense, in this area.

Can the effect of the various media on the extent of attainment of educational objectives be determined? If the extent of attainment of educational objectives can be reliably evaluated, is it possible to distinguish the degree of contribution of each of the various media to this attainment of objectives. It is apparent that the objectives of instruction have remained much the same, though methodology of instruction has changed significantly.

EDUCATIONAL RESEARCH

Educational research has been defined by many investigators as falling into one of several distinct classifications. The terminology applied in describing these classifications is often misleading; accordingly, a listing of types of research may indicate neither the nature of the study, nor the scope of the research. Often research in education is classified according to the method of the research employed, suggesting the field, the purpose, the place where the study was conducted, the application, the data-gathering methods used, the character of the data collected, the form of reasoning involved, the control of factors, or the method applied in the establishment of relationships. The traditional delineation of types of research according to the methods employed by the investigator circumscribes historical, normative-survey, experimental and a varying number of other types of research which employ methods adapted to studying complex casual relationships including the casual comparative, correlation and case study methods. In general, however, research in education is conducted for one of several distinct purposes; to determine status; to ascertain the nature; composition or processes characterizing phenomena; to trace growth, change, and development; or to study cause-and-effect relationships. The definition of research according to purpose or function appears desirable, and the inclusion of legitimacy research, status research, technological research, effectiveness research, and theoretical research as types of current educational research suggests the scope of studies reasonably well.

The design of studies, and consequently the analysis, must recognize the many variables in educational research. The evaluation of the significance of any study must be made with a constant awareness of the variables, many of which cannot be controlled, even though identified. Accordingly a particular study, considered to be valid, may simply give direction for the future studies recognized by the investigator to be suggested in order to establish reliable results. The application of statistical analysis to the data of educational research is essential. However, here mechanical manipulation of unreliable data has too often brought to the educational literature reports of studies which are misleading.

For the purpose of this Conference, educational research has been broadly defined, but critically evaluated. Each participant, a specialist in his own right, has reviewed the literature within his assigned topic, analyzed and evaluated the contributions of the past, assessed the present status, and has circumscribed areas or problems judged as requiring additional research.

THE OBJECTIVES OF RESEARCH IN THE USE OF MATERIAL FOR INSTRUCTIONAL PURPOSES

It has become apparent that the studies on the use of printed and audio-visual material for instructional purposes might be described as status studies to be used for instructional purposes within a framework which will permit the evaluation of effects, thereby providing information which can be considered a reliable basis for future guidance in the more effective use of printed and audio-visual materials.

PUBLICATION OF THE CONFERENCE PROCEEDINGS

It is with this philosophy that the present Conference was organized and conducted. The proceedings of the Conference, presenting the discussion and recommendations of fourteen participants, represent an effort not only to assess the status of the audio-visual materials for instructiona purposes, to analyze studies in the field and to project guidance for future studies and practice, but also to stimulate the interest and participation of other specialists. It is considered that the communication of philosophic inquiry, as well as of the results of status studies and research, among practitioners and individuals involved in research in the field is essential to the development of both methods and materials of instruction, the use of which will provide optimum conditions for learning at all levels and for the attainment of educational objectives. Communication of ideas presupposes accessibility and availability to whatever extent the accessibility and availability of the present compilation is limited by the form in which it is published, there is relative failure in communication. It is expected that the wide distribution of this technical report will compensate, in some measure, for the fact that the accessibility and availability of this form of publication is considered to be less convenient than if the proceedings were to appear in the open literature.

February 23, 1966

Maurice F. Tauber
Irlene Roemer Stephens

CONSPECTUS OF RECOMMENDATIONS

Though stated in the introduction, it should here be emphasized that one should recognize that research in the field of the use of printed and audio-visual materials for instructional purposes is relatively vacuous. Nevertheless, it was considered that the most pragmatic and expeditious approach to providing direction for future research and practice in the use of printed and audio-visual materials for instructional purposes at all levels was to bring together leaders in the field (including educators, librarians and media specialists embracing adeptness in the techniques and methods of instruction and the use of the various media; knowledgeability in curriculum construction, in the psychology of learning and in academic disciplines) each identifying, assessing and evaluating present practices and studies in the area, from his particular orientation, and bringing to bear the theoretical and practical knowledge, skills and judgment of his particular specialization. It was thought that an optimum climate would, thereby, be provided for integration and synthesis which could be productive of sound recommendations for future activity in the field. The desirability of a conference including a larger number of participants representing a wider range of experience and judgment was recognized. However, the present conclave should be considered as a beginning, providing an opportunity for assessment, with the end view of setting forth direction for other conferences designed as a continuation of integration and synthesis of the judgments of qualified research specialists and practitioners in this field, as well as for delineation of areas for study and projection of recommendations for methodologies to be applied in future programs of research.

For the purpose of this Conference, educational research was broadly defined. The contributors to the present volume have endeavored to determine the present practices in the use of printed and audio-visual materials for instructional purposes; to identify studies in the field considered by each to constitute significant research in this field, including both completed studies and research in progress; to evaluate identified studies and to assess the contribution of each to orientation in the instructional use of printed and audio-visual materials.

The qualified judgments of the specialists assembled for this Conference are recapitulated in the final chapter of this report and represent a detailed restatement of suggestions, recommendation, problems and unanswered questions in the field. Certain recommendations relating to this area can be projected succinctly.

INTELLECTUAL DISCOURSE

1. It is recommended that future conferences be organized, to include leaders in education and librarianship and media specialists (see following page) well oriented in the use of all types of materials for instructional purposes, aware of past and present practices, experienced in the psychology of learning, curriculum construction, the use of instructional methods, the use of the various media and research methodology; to provide opportunities for the exchange of

ideas, the integration of philosophies, experiences, judgments and calculated opinions; to project guidance for future studies and practice; to stimulate the interest, participation and involvement of other specialists in conferences of this nature on a national scale; to promote the communication of philosophic inquiry, as well as of the results of status studies and research, among practitioners and individuals involved in research; to provide a climate which might be productive of suggestions for the development of new materials, or new combinations to gain insight and understanding with respect the use of printed and audio-visual materials for instructional purposes in the attainment of educational objectives which could provide a basis for projecting recommendations for research designed to determine the extent of contribution of the various educational media, separately and in combination, over extended periods of time, to learning and the attainment of educational objectives, at different levels of education, in the various subject fields with students at various levels of intelligence and social adjustment, with different reading, listening and viewing abilities, with different aptitudes, with different interests and different attitudes.

REGIONAL MATERIALS CENTER

2. It is recommended that the materials center concept for libraries be accepted and that a network of regional materials centers and research demonstration centers be established which will be integrated, comprehensive and functional, to insure both accessibility and availability of materials and media of all types, and staffed with specialists. Included among the objectives and functions of the materials ceters should be the following:

   a. Selection, acquisition, organization and control of materials representative of all of the various media;

   b. System analyses of materials;

   c. Computer storage and retrieval of information on content of material; and

   d. Demonstration of the effective use of materials.

ACCESSIBILITY OF INFORMATION

3. Recommendation is made for the further development of information control and tools of bibliographic control to provide access to the literature. The establishment of adequate bibliographic control is necessary not only for convenient access to the literature, for effective transmission of information and the communication of ideas, but to avoid unnecessary duplication of effort.

SELECTION OF MATERIALS

4. Research is recommended to investigate the approaches provided for the selection of materials and instructional media. Attention should be directed toward accessibility including bibliographic tools and review media, demonstration centers, availability, and

importance of interdisciplinary participation.

ORGANIZATION OF MATERIALS

5. Research is recommended to explore, demonstrate and evaluate the relative advantages and disadvantages of the functional arrangement of all types of materials, in all types of libraries serving all educational levels, with attention to classification and experimentation with the intermixing of the various media.

RESOURCES AND LIBRARY SERVICES

6. It is recommended that library resources and services within designated areas be evaluated to determine, among other things, the strengths and weaknesses in collections of printed and audio-visual materials, the extent of duplication among collections; the role of bookmobiles in extending service; the effect of paperbacks on library acquisition and use; school library development in relation to the services provided by public libraries; the character of use of public, state and regional libraries; the extent to which regional depositories serve whose needs for what purpose and with what effectiveness.

DEVELOPMENT OF MATERIALS AND EQUIPMENT

7. Developmental research should be conducted, within the context provided by present orientation, and with constant attention to the recommendations forwarded as a result of the philosophic inquiry of multi-discipline specialists, with the end-in-view of developing new materials and instructional media and equipment.

DEVELOPMENT OF TESTS AND MEASURES

8. It is recommended that concerted effort be directed toward the development and design of valid tests and measures which can be utilized in the conduct of reliable studies in all areas of investigation of the use of printed and audio-visual materials.

RESEARCH ON THE USE OF MEDIA

9. Fundamental research is recommended to determine the relative effect on learning and the attainment of educational objectives of the use of the various media, separately and in combination, the design of studies to reflect full cognizance of the multiple variables implicit in such studies and to include, as well, recognition of the contribution of independent study and self-directed learning outside the classroom to learning and the attainment of educational objectives.

10. It is recommended that a series of status studies be instituted to identify access and evaluate past studies and research-in-progress on the relationship between a student's knowledge of sources, capabilities and performance in the use of libraries and library resources, and performance in courses included in the curriculum.

11. Research is recommended to determine, through the use of valid tests and pursuit using established research methodology, the differences in perception between students and teachers, the effect of various combinations of media on the awareness of experiences to individuals of varying ages, backgrounds, experiences, etc.

Irlene Roemer Stephens

ELEMENTARY EDUCATION

By

Dwayne E. Huebner

This review of the literature is conditioned by the personal interests of the reviewer. This elementary educator admits to a primary interest in curriculum theory and a relative disenchantment with educational research. After a few years of involvement in the practice and review of educational research, the conclusion was reached that the empirical and research tools of the educational researcher far out-stripped his conceptual tools. Regrettably, a review of the literature for this paper has merely strengthened rather than altered this conclusion.

In a recent review of the literature on curriculum and communication, Ramsey reaffirmed what others have said in other ways: "In communication theory and research related to formal curriculum purposes, it seems that investigators have proceeded scarcely beyond the witchcraft stage."[1] Almost any researcher can make a significant contribution to the theory underlying it _if_ some effort is made to make the theoretical underpinnings explicit. However, rather than designing studies to explore the reasons why anything should happen or why one way should be more effective than another, it appears easier to ask, "What happens if this device is used?" or "Is material and method X as effective as method and material Y?"

As has been pointed out time and time again, an hypothesis or research design is as good as the theory within which it is grounded. For this writer, to review research or to propose research is to look for underlying theoretical structures which might systematize thought, inquiry, or practice. Thus, the search strategy for this review involved a scrutiny of the literature to find a theoretical structure. A mass of studies was found (though not necessarily concerned with elementary education); also encountered were some reasonable exhortations about the use of materials and the need for the educator to accept the helping hand of technology, and much propaganda. However, finding little overarching theory, an effort to devise some kind of theoretical organization seemed indicated. This report, therefore, is concerned first with the various uses of empirical research in the educational enterprise, with much of the discussion focused (because of the crucial linkage between research and theory) upon certain theoretical considerations which seem necessary for grasping the immensity of the problem. From this theoretical base, possible areas of investigation can be suggested which might orient future research or inquiry.

This review is not focused primarily upon elementary education, because the features which distinguish elementary from secondary education are not as clear-cut as they were in the past. Historically, the elementary educator was primarily concerned with developing skills assumed to be necessary for later learning of content in the upper schools. Today, skill development is also assumed to be a function of secondary schools, as the interests in the reading and study skills at the secondary level indicate. Furthermore, non-skill content is no longer the concern of the upper grades only, for over the years the elementary educator has had to make room for science, social studies, the arts, and foreign languages. These later developments are well documented today by the ever-increasing interest of the academician in the content of the elementary school program and are characterized by the oft repeated hypothesis of Bruner "that any subject can be taught effectively in some intellectually honest form to any child at any stage of development."[2] Hence, it is not a concern for different purposes which distinguish the elementary from the secondary or college level educator. The differences existing among programs and materials at the various levels of the educational enterprise reflect the age characteristics of the student populations and the expectations of what is possible with given age groupings. Therefore, a review of the literature on the uses of printed and audiovisual materials in the elementary school should not differ significantly from one on the secondary level, except where the age characteristics of the students influence the school program significantly.

Types of Research

Educational research serves a variety of purposes within the vast domain of education. The aura of respectability which adheres to research often serves a magical function; for it is assumed that anything in education is better if there is research pertaining to it. The respectability, however, is not a result of the empirical trappings but of the rigorous disciplines which are required. Unfortunately, uses of research findings too frequently rely upon the magic rather than upon the rigorous disciplines.

Five types of educational research may be identified and labeled: legitimacy research, status research, engineering or technological research, effectiveness research, and theoretical research. Although admittedly biased in their simplicity, the labels do point to necessary functions within the educational enterprise.

Legitimacy research. This might more appropriately be called the search for legitimacy, the search for a warrant for certain practices, or even, the production of propaganda. One of the needs in education is to overcome the inertia of past ways and to convince others that new, or at least other, ways are also possible. Today, the magical element within research is brought to bear on this problem, for it is assumed that research evidence will carry more credence than other forms of information. Whenever a new device, technique, or medium is available, the burden of proof for its effective use in education seems to be up to the proponent. Consequently, research studies are designed to prove that the new approach is as effective or more effective than traditional ways. So it was with the use of films, radio, and television. So it is now with programmed materials and self-instructional electronic systems. Presumably the same might have been true of books when they were first introduced. Wendt and Butts[3] recently reviewed the literature pertaining to the comparative effectiveness of motion pictures, film strips, and slides. Schramm,[4] in the same source, summarized 393 comparisons of instructional television with classroom teaching. Fortunately, the new volume on programmed learning, edited by Glaser,[5] does not glorify this form of comparative research with respect to programmed materials. Rather, the editor assumes, correctly, that programmed materials can be of value in classrooms, and that such comparisons need no longer be cited. The chapter by Hanson and Komoski[6] in the Glaser volume refers to some of the earlier studies which sought to determine the educational effectiveness of programmed materials.

The difficulty with legitimacy studies is that comparisons are made between one rather gross method and something known as conventional instruction. Here the substitution of magic for disciplined rigor is obvious, for the researchers fail to recognize the complexities of instruction and the many variables which enter into any instructional situation. Lumsdaine and May[7] comment on this problem in a constructive and hopeful way:

> A very large number of comparisons have been made between some form (usually unspecified) of "conventional teaching" and instruction by some use of television, films, teaching-machine programs, or programmed books. Although the studies can contribute very little to a science of learning, the development of materials used in them may have made some contribution to the art of teaching. (p. 494)
>
> A related trend is, happily, a growing sophistication concerning what can and cannot be accomplished by research. This is exemplified by a marked diminution in overall "gross methods" comparisons, particularly in futile attempts to assess the overall value of media by comparisons with "conventional" instruction, and a corresponding increase in the proportion of studies which attempt to manipulate specifiable variables. (p. 512)

Siegel and Siegel likewise argue against such comparative studies and identify three reasons why such procedures are defective: "the criteria are often inappropriate or contaminated, the assumptions of homogeneity within and independence between 'experimental' and 'control' conditions are met only when these conditions are very grossly conceived; and the results often reflect masking and cancellation effects, thereby revealing relatively little about what transpires in an instructional system."[8] They go on to identify four classes of variables which should be specified: characteristics of the classroom environment, the instructor, the learners, and the content.

The need to legitimize the use of new media and instruments in the instructional process is presumably a real one. The problem, however, is basically one of identifying the values of newer media and then communicating these values to others. Present legitimacy research is not broadly conceived as a search for value but as a device to identify facts to support the claim of proponents. This use of research relies heavily upon the magic of research to enhance the facts. To use research in this way interferes with the integrity of research and the integrity of communication. Research designed for propaganda becomes separated from criticism essential for scientific development. Communication shaped as research ignores the aesthetic and craft principles necessary for effective communication.

Status research. A concern of the educational practitioner is to determine what is happening and what might happen with respect to certain practices. This normative information is important for making decisions about future practices based upon trends. Producers and consumers of materials need to be informed of what materials are now being used and their possibility of use in the future. Through status research of present and past practices trends can be determined. Status studies of the use of materials in the elementary school have not been reviewed for this paper.

Technological or engineering research. The development of specific instructional materials or instruments may be conceived as an engineering task. This is demonstrated in the development of computer-based instruments,[9] teaching films, television programs, and other instructional materials. The technological or engineering quality is determined by two characteristics. First, the purpose or function of the device is precisely defined, and second, empirical rules or theoretical principles are used to construct the instrument in order that the purposes may be achieved efficiently. This approach is most clearly illustrated in the Glaser volume on programmed materials,[10] but is also represented in Lumsdaine's review of the research on "Instruments and Media of Instruction."[11]

Much of the research concerned with the production of programmed materials and films pertains to, or at least contributes to, the identification of principles for engineering purposes. The findings suggest: "If you wish to achieve result X, then construct your instrument with quality Y." These principles may be either empirically or theoretically based. The findings about film production in May and Lumsdaine[12] may be considered empirical; they are derived from accumulated data which indicate that one procedure is more effective than another. Programmed materials developed from the Skinnerian model of learning are theoretically based and serve as an example of engineering principles derived from existing psychological theories. The engineering principles being established by Lewis and Pask[13] are also theoretically based but derived from theories created to contribute to new theoretical systems; they may make a significant contribution to a theory of instruction.

An instrument designed to achieve certain objectives must be used in accordance with certain rules or guidelines if the results are expected to reflect the intended purposes. Rules or principles in the form of teachers' guides do accompany textbooks and other packaged material but they are more frequently the result of the personal whim or experiences of the authors than of firm research studies. Audio-visual textbooks also contain rules or principles to guide the use of various media in instructional situations. Such guidelines for the use of specific types of media can be established through empirical research, as has been done, to some extent, for film by Lumsdaine and May.[12]

Another aspect of engineering or technological research is the systems approach which has been evolving slowly in education, but which has been in industrial and military circles since the Second World War.[14] The concern here is not with the development of a single instrument but with the integration of one or more instruments within a total system oriented to achieve a well defined purpose. In education this is reflected by the grandiose schemes in which many types of materials may be integrated into a single instructional system. O. K. Moore's use of the electric typewriter in a carefully controlled responsive environment to teach reading and writing is one example.[16] Plans underway at Systems Development Corporation to tie programmed learning techniques into computer technologies is another.[17]

However, the all-encompassing schemes and systems which are now in the proposal stage do not seem to offer the most significant consequences of system analysis for schools. It seems more helpful to consider the ongoing school or classroom situation as a limited instructional system; limited in the sense that not all materials or teacher behaviors are or can be carefully and thoughtfully designed or used to achieve well defined purposes. The various factors which make up that system become appropriate variables for research. For instance, in any ongoing instructional organization, school, or classroom, routines and patterns emerge which the teachers and administrators believe are necessary for the achievement of their explicit or implicit purposes. The introduction of a new device, medium, or collection of materials requires that new patterns of classroom or school organization evolve; otherwise the new instrument will be rejected like a foreign body in an organic system. Much of the research concerning the use of materials in schools is concerned with the impact that the materials have upon the attitudes of teachers, administrators, students, and parents and upon existing ways of working within the classrooms and schools. Guba and Snyder report a study of the impact of the Midwest Program on Airborne Television Instruction on elementary teachers and their classroom procedures as they use the ITV programs.[18] Their competent empirical design does not compensate for the inadequate theoretical conceptualizations upon which it is based. Consequently, the findings contribute little to an understanding of the impact of ITV on ongoing classroom procedures. At a different level of empirical sophistication are the Four Case Studies of Programmed Instruction.[19] These authors did not seek a rigorous empirical design but explored in a careful manner, sometimes using objective techniques, but frequently depending upon subjective insights, the consequences of using programmed materials in a variety of situations. The results are not a series of generalizations which can be applied to other systems, but an identification of some of the possible influences and factors which must be considered when programmed materials are used in existing school situations. At another level, Schramm and Oberholtzer report the findings of a three-year study to determine the most effective context for teaching Spanish to elementary children with television. They studied several variables in a variety of combinations and found "that an effective context can be built for instructional television. The best combination of techniques being teacher-directed practice and electronic aids with feedback in the fifth grade, and teacher-directed practice, programmed instruction, and a Spanish corner in the sixth grade, supplemented with parent participation at home. Even a teacher inexperienced in Spanish could learn to manage efficiently the combination of activities built around television."[20] The original research report was not consulted so details of experimental design cannot be evaluated. However, the intent of the project, and the briefly reported findings, indicate a concern for the design of an instructional system incorporating many instructional instruments rather than an attempt to determine what one medium can do. To have maximum value, a study should seek not simply to identify the best design for teaching Spanish around a television base, but to suggest principles which might facilitate the design of systems for other purposes or around other primary instructional bases. With several such studies at the elementary school level, reasonably valid generalizations for guiding the integration of several media to accomplish given purposes might be established.

The notion of an instructional system is a significant one for guiding and directing future research in the use of instructional media in the elementary schools. Too little is known about the consequences of new media and instruments upon the behavior of individual teachers, the organization of the schools, and the utilization of other media and instructional instruments. Efforts such as Project Discovery[21] appear to fall more within the category of legitimacy research or demonstration. This is unfortunate, for flooding elementary schools with sufficient visual materials could lead to reasonably valid generalizations about changes within instructional systems as new media are made available. Studies of the interrelationships among various media do not appear to be too common. Travers[22] reporting on a series of experiments, points out that transmitting redundant information simultaneously through both auditory and visual modalities has no advantages, except where unusually high speeds of transmission exist. His studies question the rather usual elementary school procedure of presenting information in a variety of forms to children. However, these studies must be interpreted in terms of the desired specificity of outcomes and the usual need in the elementary school for more broadly conceived outcomes because of wide range of differences among children.

Problems of the interrelationship among media and other instructional vehicles are rather handily conceptualized as problems of instructional systems. However, for curricular purposes the notion of system is limiting if seen only within a technological or engineering framework. One of the basic factors in instrument and system design is the ability to specify clearly expected or desired outcomes. Whereas this is possible and necessary in much education, and is in fact too often neglected by many teachers and media specialists, the totality of education cannot be encompassed by such a means-end technology. A more appropriate concept is that of instructional design, rather than system, for the term design associates the fabrication of the educational environment with other artistic processes.

Effectiveness research. Much of the experimental literature seeks to identify the effectiveness of specific media for given target audiences, content areas, or categories of educational outcomes. For instance, Alden reports that films may be used effectively to teach factual information over a wide range of subject matter, content, ages, abilities, and conditions of use; that there is no negative evidence to indicate that they can't teach concepts; and that they may be used to modify motivations, attitudes, interests, and opinions.[23] Similar research findings could be found for television and strip films. Current research in auto-instructional techniques indicated that they may be adapted to most instructional areas. The exciting direction in the auto-instructional field comes from the realization that different kinds of programs may be developed for children with different learning styles, backgrounds, or intellectual abilities or interests.

The search for effectiveness is more appropriately identified as the search for educational value. It is usually subsumed under the typical question "How effective is instrument X, in subject area Y, for students Z," because the prevailing educational ideology forces all questions of value into the technical value system, in which the major form of rationality is a means-ends rationality. This is probably one of the reasons that the first studies of any newer media are couched in the general schema of "Whatever you can do I can do better." The proof of the value of a newer medium is that it accomplish existing purposes as effectively and efficiently as prevailing media or forms of instruction. The unfortunate consequence of technical rationality is that it hides or discourages the identification of other values which might be unique to a given medium. However, this search for value can only take place if existing conceptions of education are broadened to enable the media specialist to fulfill his role more effectively. The search for value is tied directly to the problem of theory.

Theoretical research. Empirical research, adequately grounded in the theoretical underpinnings which give it form and language, contributes to the testing of existing theoretical statements or concepts and the emergence of new concepts. Many of the current developments in educational media contribute directly to the testing of communication and learning theory. Some programmed instruments are almost direct tests of reinforcement theory, a la Skinner. Much of the computer-based technology is an expression of communication theory and cybernetics. That instruments can be made to shape human behavior attests to the effectiveness and validity of the theoretical ideas from which they are derived. Other research developments are gradually extending the range and power of theories of teaching and instruction, as Lewis and Pask indicate.[13] Behind the use of instructional media in the schools are certain conceptions of the educational process which are also theoretical in nature. The theory is not scientific, however, for it lacks logical rigor and contains prescriptive as well as descriptive elements. Because alternative ways of thinking are seldom proposed, it is infrequently thought of as a theory. Rather, it tends to be a form of conventional wisdom, accepted because the forces of circumstance have not yet pointed to its limitations. The development of newer media and the interest of the non-psychologically oriented person in the affairs of education may make more obvious the theoretical conceptions currently determining educational thought and action and the emergence of new forms of educational thought.

The major characteristic of educational thought today is its means-end quality. It is assumed that the ends, objectives, or goals of education can be adequately identified and defined. In fact, two volumes[24] are available to help the educator state his objectives behaviorally so that they can be of maximum use in planning and evaluating. The assumption is made that once objectives are specified, then learning theory, or perhaps eventually a teaching theory, will guide the designing of experiences which will lead to the learning of these terminal behaviors. Education has been equated, in other words, with learning. Goals or ends are defined, and means are selected or determined through the instrumentality of learning theory. Seen this way the instructional process has the two major problems of specifying ends and selecting the most effective means. Instructional media are forced, by this conceptualization, into the position of means. The values of educational media are determined by their effectiveness for achieving ends efficiently and effectively. The expression, "audiovisual aids," supports this conception of education.

The value and effectiveness of this means-ends rationality cannot be disputed. The importance of clearly defined objectives and the significance of learning theory are clearly signified by the potential power of the new instructional tools. It can be argued, however, that the concept of "learning" is not sufficient for describing all educational activity; and that the notion of goal or objective does not complete the forms of educational value which can be realized through educational activity.

Possibilities for Research

Stated another way, present educational thought conceives of education as a process of abstraction. The student abstracts from the flux of experience certain competencies such as skills, knowledge, and attitudes. The educational environment is designed to contain the necessary ingredients (objects, ideas, practice possibilities, and reinforcers) in order that the student can readily abstract from it that which is considered educationally valuable. It is this notion of abstraction, of a student taking into himself new knowledge, skills, and attitudes, which must be questioned in order that educational materials can become more effective in the schools.

The search for theory. Consider the proposition that educational media and the skills and language of the teacher are not simply vehicles or means to ends but that they are the content of the educational environment. The question to be asked is not simply what can be learned from this content, but rather, what educational values can accrue or be manifest as students and teachers interact with the materials or people in the educational environment. In this context, the significance of learning theory is more readily seen. Teachers use language or other symbolic forms to communicate with the children. The messages in material are couched in symbols of some sort. The communication process between student and material requires that the student know the rules of the game by which those symbols are organized and used so that meanings which are in and yet beyond symbols can become manifest.

Likewise, the student must know the rules of the game of conversation between himself and the teacher or other people in the classroom. These rules of symbol use, whether semantic, syntactic, or pragmatic, are behavior forms which have a certain amount of stability, uniformity, or recurringness. They can be abstracted from the flux of human experience. Human behavior can be molded or shaped to conform to these rules of usage, i.e. rules can be learned. Speaking is partially a rule-guided enterprise, as is the process of reading. Arithmetic and mathematics are also symbol systems heavily structured by syntactical rules which can be made explicit. The various disciplines within the sciences and the arts are also partially rule-governed behaviors about the use of certain symbols. Learning may be considered the process of mastering the rules of various forms of social usage, in this case the use of symbol systems, in order that meanings may be made available and dealt with.

Can meanings be learned? This seems to be the crux of one of the problems confronting the educator today. Perhaps the question can best be answered by presenting specifics. Can one learn Tolkien's *The Hobbitt?* Picasso's *Guernica?* La Morisse's *Red Balloon?* Carroll's *Jabberwocky?* Of course, one can learn *Jabberwocky,* but this means that one has memorized it. Poetic meanings may be beyond some who memorize the poetry. It can also be said that one can learn *from* such pieces of art. Something about Tolkien can be learned from the *Hobbitt.* From *Guernica* one can learn something about visual design and about how Picasso saw and felt war. But does a student *learn* meanings? The answer is probably no. A person is confronted by meanings, and must respond to them from the depths of his own being. In doing so he becomes a different person. He grows or develops or emerges or transcends himself. Becoming a different person, though requiring learning, is not necessarily learning. Rather it is the human quality of the emergence and making of one's life, of one's own meanings. To respond to the meanings of others as they are presented or made available, is to ask consciously or unconsciously, "Who am I?" That this process is infrequently brought to the level of consciousness is a reflection of the quality of our schools and our society, and a consequence of the mass arts which do not ask "Who are you?", but which reflect back to the respondent need not to be subsumed under a theoretical conception which equates education with learning. Some educational activity can be the confrontation between the student and the meanings of other people. This confrontation results not in predicted outcomes, but in the emergence of new responses and possibilities within the student. These responses are unique to the student, emerge from his own history, and are or can be highly personal. To identify the meanings inherent in a work of art or in a message, may require skills of analysis and criticism which are beyond the skills of simply using rules of symbol systems. A youngster may be able to read a book, yet lack the critical ability necessary to unearth the meanings so that they can confront him. The skills of criticism fall within the domain of learning, for it can be assumed that they too are reproducible usages which can be abstracted from the flux of human experience and hence learned. But critical skills are not the end of the educational act; they make possible the confrontation with meaning which is the end of all skill teaching and of all learning. If this conception of the instructional process is accepted, certain suppositions about education as a system can be postulated.

If the educational system is seen as a system of interaction among students and teachers with instructional materials for the sake of achieving defined ends, then it becomes a relatively closed system. Materials are produced in order to make possible the achievement of the ends. The creation or definition of the ends may extend beyond the educational system to other groups within the political system, but given these ends there is a certain neatness about the self-contained quality of education or schooling. The closure of the system is indicated by the process of evaluation. Given ends and materials to reach them, it becomes possible to determine whether individual students are achieving up to expectation. If not, they can be shunted into other phases of the educational system. Dissatisfaction with efficiency or achievement may lead the educator to search for new means to achieve these ends; hence the scanning of the technological field to see if newer developments or media can help achieve ends.

However, when the educational system is seen not only as facilitating learning but as a confrontation between the student and meanings of others via artifacts or communication channels, then the educational system cannot be contained within the institutionalized system of education as it is presently conceived. The school becomes a meeting ground between the students and the meanings of others. This is most clearly epitomized within the science fields. Scientists are now actively involved in the education of children. They are making available scientific meanings to which the students respond as individuals. This process is masked behind the facade of producing new courses of study or new instructional materials. But the facade will crumble when the present materials or courses of study become dated. When that happens the scientist must again become involved. To prevent outdatedness, scientists will have to institutionalize their involvement. The problem is acute in the sciences because the meanings within a science undergo such rapid changes that materials are soon dated. Here, then, education seems to be epitomized as a process of communication between students and those who make available certain meaning as a consequence of their professional lives. The materials used in the classroom, then, are not simply vehicles to assure learning but the communication of meaning between groups of people at different levels of development.

The construction of materials is a part of the educational process, for materials are an aspect of the communication process. Education as a system cannot be the school as a self-contained or closed unit. The school, or education as a system, is a series of communication channels between young people in search of meaning and more experienced people who provide meanings which confront the young. Accompanying this, of course, must be instructional activity which helps the students learn the symbolic and critical skills necessary for unearthing the meanings to which they are to respond personally. Materials are never simply instructional aids or resources. Some materials are messages or meanings; not aids, not resources. They are frequently the "other" without which the process of education is impossible.

A conception of the education process such as the one hinted at above is not a tight theoretical system which can be proved or disproved by research. However, research about educational media can be influenced by such a conception and can, in turn, sharpen and refine the conception. The remainder of the paper is concerned with the categories of research suggested earlier, now broadened by this conception.

The search for value. Earlier, one category was labeled "effectiveness research." Effectiveness, however, is but one form of value. It makes sense when end states can be clearly defined and procedures evaluated to determine their effectiveness as means. But when educational activity is viewed not only as a means to an end, and when materials are not simply tools or resources for learning, then the effectiveness category becomes limiting. Much current educational research designed to determine the value of newer media is limited by a limited conception of value. When newer media are conceived only as instruments for instruction their values are determined in terms of their effectiveness to do what other instructional media or patterns have done. Furthermore, the term research becomes unfortunate. The educator too easily forgets that research is made up of RE and SEARCH. However, with new media the first problem is simply to identify, to SEARCH for possible values. When values have been identified, then their existence can be RE-search, can be identified more objectively. With respect to new media which have educational potential, the inquiry must be broadly directed to the search for value.

A four dimensional grid is necessary to conceive of the possible types of search for value. The first dimension is that of the category of value and the question is, "What categories or kinds of value can be identified?" The second dimension is that of media, and the question is, "What values can each educational medium make manifest?" The third dimension is that of educational subject, and the question is, "What values are possible in any given educational subject?" The fourth dimension is that of the age level of the student, and the question is, "At what age level can a given value be realized or manifested?"

At least four categories of value can be identified: technical values, meaning values, moral values, and power values. These are meant to be pointer concepts, more suggestive of research possibilities than of rigorously defined classes.

1. Technical values: The use of a variety of symbol systems in the school means that the students must be skilled in using and interpreting the symbols; i.e., they must develop competencies to use the rules of a particular symbolic game and competencies to interpret particular messages or symbolic forms critically. Various media can be used to develop the skills of usage and the skills of criticism. If the skills can be readily and precisely identified, then research can be undertaken to determine which medium, or combinations of media, can most effectively and economically facilitate the learning of the desired skills. The entrance of new media on the educational horizon means that new kinds of skills and criticism must also be identified. Skills for handling printed and spoken language and mathematical symbols are readily recognized. The skills of criticism are not usually considered part of the elementary school. The introduction of new media in homes and school suggests the

very real need for inquiry into the possibilities of teaching criticism of television, film, newspapers, recordings, and programmed materials. This reviewer has not made an effort to scan the literature for such studies, but his acquaintance with the general literature of the elementary school would indicate that these skills are not usually a part of the elementary school curriculum. There is no reason why they couldn't be, and many reasons why they should be. Work in this direction at the secondary level is available, for instance, in the publications of the National Council for Teachers of English.[25]

2. Meaning values: There are at least two types of meaning values that can be identified. First, consideration should be given to aesthetic values inherent in particular media. A novel communicates different kinds of meaning than poetry or film. Presumably, television offers possibilities for the emergence of new aesthetic values not possible in film or phonograph or radio. Through the arts of television the student can be confronted with meanings and experiences that cannot be communicated through any other media. Each medium offers the possibilities of new forms of confrontation between the students and the meanings of other people. The technical concern for programmed materials has hidden its aesthetic qualities, and one might ask, "What kinds of aesthetic meanings are hidden in programmed materials?" Any new technical development which has communication possibilities opens up the possibilities of a new art form and thus the carrying of new meanings. It is this realm that has been missed in most educational research by the focus on technical values and the means-ends conception of education.

Another kind of meaning is associated with McLuhan's "the Media is the Message" slogan.[26] He states that "the 'message' of any medium is the change of scale or pace or pattern that it introduces into human affairs." (p. 8) If this is the case, then the use of any new media automatically forces the user into new awareness of the world and its possibilities, although this awareness may be unconscious and hidden. If a new medium structures or restructures a person's relationship with the rest of the world, then the value of the media as a meaning in-and-of-itself must be brought into educational activity. The student should be confronted by the medium as a value or as a type of meaning which confronts him and to which he must react. In so doing he is consciously or unconsciously asking and answering the question, "Who am I?", for the medium is making him a different person than he was before. The significance of programming techniques is again hidden by the concern for values of effectiveness. The format of programmed materials is quite different from the book or the magazine. In fact, when the programmed materials are incorporated within a complex computer system, the communication vehicle becomes unfathomable to the ordinary person. The student, nevertheless, uses the instrument as a communication tool assuming that he is learning only the content of the program. But how are programmed forms shaping his reactions to other aspects of the world?

3. Moral values: Another kind of value that media have is their ability to restructure or influence human relationships. One of the significant values of programmed materials is that the student can be freed from certain kinds of unreasonable or at least personal and idiosyncratic demands of the teacher. He need not be under the teacher's every whim, nor influenced by teacher's actions which pattern his behavior towards adults rather than to rules of symbol usage. For instance, some studies of the Edison responsive enviroment, engineered by O. K. Moore, indicate that emotionally disturbed children can learn to read and write with the machine, which they had not been able to do with teachers because of relational problems. One of the characteristics of new media, then, is the possibility of remaking the social situation within the school, thus recasting the moral dimensions of educational action. Technical developments can give the student greater freedom of choice, free him from artificial demands of mass life, and open up new possibilities of human contact among his peers, adults in the school, and adults outside of the school. A new medium becomes a part of the environment, thus recasting other forms of behavior in that environment, including social behaviors. For instance, a novel or essay encourages discussion among students and teacher about the meanings in the novel or essay and the meanings of each reader. How will the existence of programmed materials influence the possibilities for conversation? The search for the value of new media in instruction should include the search for new or altered patterns of human interaction and the realization of new moral values within the school.

4. Power values: Finally, media offer various possibilities for altering the power of the individual in his interactions with the environment. For instance, the telecommunication systems increase the power of the individual to communicate with others at a distance. The use of conference telephone equipment in the school means that a class of children may easily talk with people in other parts of the city, country, or world. In one school, the principal hooked up conference telephone equipment to an amateur radio station in the area, and the children in the school were able to converse with children in parts of Latin America. Micro- and telescopic equipment increases the power of the eye to see that which is ordinarily invisible. Overhead projectors increase the power of the teacher to construct his ideas in visual form before the students. One form of search that should be undertaken is to determine the value of various media for extending the senses of the teachers and students beyond their normally accustomed range. A limited amount of the research on the uses of television has done this. Television has been used to bring elementary school classrooms into college classes and to make visible to a large group the intricacies of surgery. More of this kind of search with other media is necessary.

Another form of power is that connected with the use of symbol systems. Arithmetic may be taken as an example. One of the values of arithmetic is that it increases the power of the student to deal with personal situations which are quantitatively problematic. In the search to increase the effectiveness of teaching and learning arithmetic, this power value is too often neglected. The child's progress is determined by what he knows, not by his mastery over his personal quantitative world. The differences between skill learning and skill use are hidden by the kind of arithmetic materials now in existence. However, the developments of programmed materials and other educational media increase the possibility that the power values of arithmetic could be augmented. The confrontation between the child and a problematic situation could be developed through non-print materials. They could be so structured that he could identify what he can do and cannot do. Then he could easily turn to a limited program which would develop the necessary skills quickly and easily. The programmed material would be seen as an instrument to increase his power of control over quantitative meanings. Specific packages of materials, drawing upon programmed techniques, could readily be available to develop very specific skills, while the use of these skills could be manifested through other kinds of educational material. Such packaged materials are being developed in some content fields. The development of programmed techniques could increase children's awareness of the power possibilities of new skills through the use of materials designed specifically to augment their symbolic powers. Most sub-skills of the major skill areas of reading, resource and library skills, map reading skills, study skills, etc., could be packaged into materials.

Given these categories of value, the educational researcher could turn to each medium and ask "What values possibilities are inherent in this medium? What new meanings can be brought into the classroom? What changes are possible within the social structure of the school? How does this medium change or enhance the student's use of his other senses and other media? How can this medium be used to increase the student's power with a variety of symbolic forms? How effective can this medium be for the teaching of various skills and critical abilities?" The researcher could then turn to the various subject areas which are either normally associated with the elementary school, or which become possible as elementary school subjects because of new media, and ask questions of the same sort. "What meanings are inherent in a given subject area and how can the various media make them available? What skills are necessary for coming to grips with the meanings of a given subject, and how can these skills be taught most effectively through the various media? How can their power be most readily communicated to the student?" Finally the age level of the student must be taken into consideration and the interaction of media, subject, and value categories determined. The Bruner hypothesis quoted earlier is not only a challenge to subject matter specialists, but a challenge to the media specialists as well. To teach new content to younger children requires awareness of the structure of the subject matter, and awareness of the characteristics of the various media which can be used to make that subject matter available to children.

The Search for Principles to Guide the Design of Educational Materials.

The inadequacy of research which was primarily engineering or technological research was hinted at in the first part of this paper. The rationale developed above provides other reasons why an engineering approach alone is inadequate for the design of educational materials. Engineering principles are essential for the maximizing of values of effectiveness or efficiency. Materials designed to achieve given ends must take into consideration the characteristics of the ends desired and the variables which lead to the shaping of those ends. The research in the Lumsdaine review[11] and in the Glaser book[5] is critical and essential for the establishment of such principles. As soon as materials are designed to manifest other educational values, other principles must then augment engineering principles. The embodiment of meaning is essentially the work of the artist. Novels, poetry, great films, indeed great scientific theories are the work of artists. To embody in educational materials meanings which draw forth responses from the students requires more than simply technical skill, more than even high craftsmanship. It requires artistry. Valéry, for instance, states that the artist's intent is "to conjure up developments which arouse perpetual desire,"[27] (p. 193) "to exact of his audience an effort of the same quality as his own,"[27] (p. 161) and "to provoke infinite developments in someone."[27] (p. 151) It would seem that the design of materials to enhance the student's power in a given skill area would require completely different aesthetic principles, for the intent of these materials is to heighten the student's awareness of himself, and his level of proficiency, rather than drawing his attention to others. Finally the search for the moral values of a new media suggeststhat they must be designed with some awareness of the social situation in which they can be used, and an awareness of the moral qualities which are possible in that situation. These considerations, combined with the interpretation that the educational system is basically a series of communication channels linking students with spokesmen for other meaning systems, suggests some guidelines for organizing for material production. Inasmuch as socially significant meanings continue to change in the society and new media continue to evolve, the production of education materials must be continuous. The search for the most effective material or the best material, or even the best organizations of materials, can only be a search for the "best" at a particular time and place. Furthermore, because educational materials must serve a variety of values, they require the cooperative efforts of a variety of people. The cooperative efforts of an editor, writer, artist, and production staff to create a good children's book is a case in point. Engineering principles are probably best contributed by the learning technician. The possibilities and limitations of the media are probably best known by the media specialist. The aesthetic qualities of the message or the meaning are most aptly in the domain of the scholar-artist. The moral dimensions of use might best be known by the practical educator or at least someone sensitive to the moral possibilities within schools. Research into each of these dimensions of the finished product or artifact is possible and necessary if the possibilities of educational materials are to be realized and if principles to guide such crafting are to be discovered. Equally important is the search for understanding the dynamic interplay among the various people responsible for the production of educational materials. For instance, the Elementary Science project of Educational Services, Incorporated, has brought together a variety of craftsmen and technicians to produce new science materials for the elementary school. These materials are carefully designed by scientists working hand in hand with experienced teachers, and then the pilot materials are field-tested before final production. Study of the organizational structure of E.S.T. might produce principles which would aid the evolution of other material-producing organizations. Comparative studies of a variety of material production organizations would add immeasurably to the understanding of an important phase of the curriculum.

The Search for Principles to Guide the Design of Educational Environments.

Institutionalized education occurs within some kind of planned environment. Teachers and administrators are responsible for bringing together the ingredients necessary for education into some kind of reasonable and meaningful patterns. Two current trends in educational thought tend to interfere with the evolution of new ways of thinking about this process; both are sometimes thought to be some kind of panacea. First are those critics or students of education who propose a specific educational structure for schools. At the elementary school level this takes the form of such proposals as Stoddard's Dual Progress Plan, or the team teaching proposals. These are valid educational proposals, as long as they are interpreted as possible patterns for organization, not necessarily the best or only desirable organization. The other form of educational thought which can interfere is the focus on system design. Again, the notion of system design is a valid one, which should reap many benefits eventually in the organization of elementary schools and educational materials. However, the notion of system suggests a system or the best system for given purposes. Given the nature of individuals, students, and teachers in schools, it hardly seems possible that the system will ever be found. Clearly, however, those responsible for educating children have the responsibility for designing the best possible environment given available resources and personnel. Because of existing differences among schools, personnel, and materials, the design must be unique to a given situation. However, the principles of design can well be discovered through processes of search and research, and school people can be expected to be familiar with these design principles. The design of an educational enviroment may be considered from the point of view of the teacher or classroom, the adminstrator or school, and the superintendent or school system. Only the first two levels will be considered.

The classroom curriculum process is one of bringing into the classroom the materials and teacher competencies necessary to develop valued skills and critical abilities, and to make available to the children the socially valued meanings to which they can respond and from which they can evolve their own meanings. As has been pointed out earlier, the educational ideology or conventional wisdom which suggests that the first step is the identification of purposes, followed by the selection of appropriate materials and activities, is not sufficient. Part of the valuing process follows from the characteristics of the teachers, the students, and the materials that are available on the educational horizon. The values emerge as the teacher considers the various possible components of the environment. Hence, the teacher must know intimately the educationally important characteristics of the children, the skills, critical abilities, and meanings which are appropriate for the age level under consideration. However, the skills, abilities, and meanings are determined as much by the available materials as by some educational philosophy or point of view. The teacher must then be aware of the communications available from people outside of the school which are valuable for his students, and the media in which or by which these are expressed. Once again, the means-ends rationality gets in the way. For as long as teachers conceive of materials as means to ends already determined in their own mind they scan new media as possible means only, and the problem of proving effectiveness arises. Media pushers are partially responsible for this lack of acceptance of new media. They, too, fall into the means-ends trap. Teachers need an educational ideology which equates the evolution of new media with the development of new messages, and consequently the emergence of new educational values. A possible area of research would be to determine the conception teachers have of educational values, the relationship of educational media to these values, and how these conceptions can be modified. Glaser pessimistically rejects the assumption that "teaching practices will change if teachers are shown by research that their teaching can be more efficient" and suggests that "the behavior of the instructor is an aspect of an instructional system that is least amenable to change and innovation."[28] However, Glaser's pessimism seems to be more related to current organizational structures of schools than to inherent characteristics of teachers. Given a school organization requiring fewer predetermined activities from teachers and providing more time for them to become masters of their own art, his view would probably not be viable, as is the case in some of the better elementary schools.

The teacher's role is that of a craftsman or artist. Given all of the variables with which he has to work, his task is to create an educational environment which makes possible the realization of significant educational values. To accomplish this the teacher needs reasonable control of all of the elements which enter into classroom action. These elements are the instructional materials produced outside of the school, the materials produced by the teacher, and his own language. Consequently, the teacher needs time to master these materials. He needs opportunities to recognize and bring out the various values that reside in given media and their messages. Teacher preparation is deficient in this respect.

Teachers are perhaps taught how to operate machines, and how to use textbooks and other resources; but they are not given the opportunities to know the characteristics of the media and their symbolic forms. They are given infrequent opportunities to learn the critical abilities necessary to uncover the meanings of messages in the various art forms and media; they are too infrequently provided the opportunity to master the new technologies and their possibilities within the classroom, such as overhead projectors and 8 mm cameras and projectors. Because these media and messages are not under fingertip control, the teacher is unable to bring them into the emerging curriculum design within the classroom.

The significance of the instructional materials center and specialist must be seen in this light. The teacher, too busy with his teaching to keep abreast of all new developments, needs someone nearby to scan these developments and to bring them to his attention. Likewise, he needs someone to help him develop the skills or to use the media and messages for him until he can develop the skills. The values to be realized in the classroom depend very heavily upon the materials and media which come into the teacher's field of attention. Only by being renewed by new materials, media, and messages, can his classroom maintain the vitality year after year or even day after day.

The research possibilities are many. The key problem is locating the principles which can guide the design of an educational environment. This would require identifying teacher variables, but more important identifying the relationship between the teacher and the materials and media available for use. The latter implies that someone in the school system is scanning the material-media horizon to determine what is coming up or is already available. The design of the educational environment requires concern for engineering principles of effectiveness and efficiency, but also aesthetic and moral principles. A classroom environment can be a work of art. Every artist is a craftsman who has mastered the tools of his trade. The materials and language systems available to the teacher are his tools.

At the school level, the administrator has the same problem of design. His design is that of a school with a variety of teachers, classrooms, and groups of children. The unfortunate characteristic of the current discussions of school structure is that they are not searches for design principles, but proposals for specific designs. The structure of the school is a function of the resources available to that school. The administrator's job is to keep that organization or structure flexible, alive, and growing, and serviceable to the children. Conceiving of the school as the channel of communication between the students and people outside of the school who have something to say to them means that someone in the school must be alert to the messages which are being produced for children. It also requires that someone in the school must assume responsibility to see that students have the necessary skills and critical abilities to confront these messages, and consequently, that someone on the teaching staff is competent to help them with these skills. Because personnel and material resources within school differ, and because the media and messages will continue to become available in increasing quantity, and hopefully, quality, it is essential that the school administrator be knowledgeable about the principles of designing a total educational environment within the school. The location and characteristics of some kind of instructional resource center become crucial elements in this design, as do the qualities of the personnel responsible for materials and media within the school.

The Political and Economic Realities of Educational Materials and Media.

Earlier in the paper reference was made to legitimacy and status research. The former was viewed as the search for a warrant or for approval of the uses of new media and materials. The latter was viewed as an aid to policy decisions. Both of these seem to be aspects of the larger question of educational change. Educational change is rather glibly talked about as if it were only a matter of research and ideology. The educator needs more than knowledge and the ability to convince others of the correctness of his actions. He needs to be aware of the political and economic realities of educational change.

Schools are social institutions which serve public policy. The policy is determined by those who have power to make and enforce decision. A change in the curriculum, in the organization of the school, or in the use of certain kinds of materials, may be looked upon as a change in the policy of that institution. Much of the argument and discussion about the aims of organization of the schools is political discourse which seeks to realign educational power structures. New developments in instructional techniques, media, or content are grist for the public policy mill, unless interested members of the community are asleep. One of the major sources of control over policy is the control over symbol systems which shape public opinion and shape, justify, and legitimize various policy actions. The other source is control over the financial resources.

As was pointed out earlier, the educator needs to know the values of the various types of instructional materials and media. However, he also needs to communicate these values to others in a way that attracts their attention and wins their support. This means that the findings of the search for value must be transformed into significant symbols and made available in the mass media or selective media that hit certain lay and professional groups who can influence school policy. An analysis of the content of the mass media with respect to the use and value of the various new media developments in education would be interesting. For instance, to what extent has the focus on instructional television and programmed materials in the schools detracted from the coverage of the need for elementary school libraries? How have the mass media reinforced certain conceptions of the elementary school so that the lay public sees new approaches to phonics or the ITA as a cure-all for reading difficulties, thus ignoring the significance of good trade books in classrooms? Unfortunately, the magic of empirical research has been used to replace good discussion and argument on the relative merits of certain materials in the elementary schools. A sophisticated analysis of the various reports on elementary school programs in the mass media should be made to determine how the public's image of good education in the elementary school is being formed and how it might be formed. Certainly, in most schools the library and instructional materials center is taking a back seat to team teaching, programmed materials, and various panaceas.

However, school policy is not formed only by public opinion, but by the available money. Policy problems cannot be solved only by more money. They will require an understanding of how the development and evolution of a school program is determined by economic factors. No curriculum book discusses the economics of curriculum change. The literature on the economic aspects of education has not been surveyed, so this writer is not familiar with studies which explore the problems of obsolescence and capital investment in materials and media. There are, of course, estimates of how much should be spent on certain kinds of resources, for example, the library. But the economic problem of evolution is ignored. For instance, Mechner reports that it costs "between $2,000 and $6,000 to produce one student hour of top-quality, behaviorally designed instructional material."[29] What is the cost of the production and distribution of other materials for education? How much does instruction by one form compare in cost with another? Assuming that a system has a limited budget, how can school officials make a ten-year plan to move the school as quickly as possible into new uses of media? Much of the discussion and argument for the use of television is based upon economic reasoning, yet the various dimensions and alternatives have not been spelled out. It also costs money to update a teacher in order that he can use new techniques effectively. An elementary teacher who teaches a self-contained class for five and one-half or six hours a day simply does not have time or energy to make preparations for tomorrow's class and also learn new techniques. Once-a-week meetings after school are also a drain on the teacher's energy and cannot be expected to produce significant results. Teachers who have opportunity to work all summer on a new program, or who can take days out of the teaching week while a substitute takes over the class can work up new materials and approaches. These financial problems are generally ignored. They are crucial if educators are to understand the dynamics of instructional change and the evolution of new media in instructional programs. There is desperate need for penetrating analysis of the economics of instructional materials, their production, distribution, and use in elementary school.

Conclusion

Much research concerned with instructional uses of print and audio-visual materials is inadequate because it does not aim high enough. The researcher frequently fails to recognize that the categories he uses to formulate his research questions and to organize his data are theoretical constructs. Consequently, any empirical research study can be a test of the theoretical constructs. Furthermore, the researcher who fails to recognize and expound the theoretical underpinnings of his study unconsciously limits his study. He will fail to recognize that he has alternative ways to formulate his problems and will miss relationships among categories or factors which are hidden by the conventional wisdom. All who submit research proposals should be required to make explicit the theoretical foundations of the study, and to state how the study contributes to the crucial testing of existing and development of future theoretical notions.

There seems to be no need for the continuation of research designed to elicit support for newer media. The assumption can be made that any new technological development has inherent value for education. The problem becomes one of identifying these educational possibilities, and then finding ways to insert the newer media into the schools. The research problems should not be confused with the political and economic realities of school operations. The identification of value and educational possibilities requires a protected environment, in which the man or agency with insight may freely speculate and experiment with the educational uses of newer media. At the same time, the educator needs better warranted assertions about and theoretical tools for understanding the dynamics of educational change. These two streams of inquiry, the exploration of potential value and the search for political and economic understanding, merge as the educational statesman and craftsman seeks to construct an educational environment which reflects his vision of what is educationally possible.

To construct an educational environment, the educational craftsman, whether superintendent, principal, or teacher, needs design principles to guide him. Here the educational researcher and theoretician have been deficient by assuming that all education is a technological phenomenon, and forgetting that it has aesthetic, moral, and political dimensions. The design of an educational program cannot be the search for the best final solution, but the bringing together of many environmental factors into a significant and meaningful pattern. Hence, an educational program must be unique to a given situation. The search for design principles is a major need in educational research.

Finally, the educational system cannot be seen as simply the school organization. Those who produce and distribute educational material are as much a part of the educational enterprise as are teachers. If materials are viewed as channels through which flow significant information and messages between those people at the forefront of today's world and the children who will be there tomorrow, then the content of educational materials must stay flexible and moving. Scientists who are working in the production of materials for schools cannot interpret their activity as simply updating materials; for that which they update will too soon be dated. Their activity is part of the educational process and their participation must be continuous. The same is true of scholars and other people at the edge of the major fields of human endeavor, for they too must become involved in the total educational process. Educational theory is deficient to the extent that it views the educational process as an experience of the student with materials. The production of materials is also a part of the process.

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SECONDARY EDUCATION

By

Phil C. Lange

In his paper, Huebner has identified five types of educational research: (a) legitimacy research, (b) status research, (c) engineering or technical research, (d) effectiveness research, and (e) theoretical research. The research reports of use of printed and audiovisual materials by secondary school students and teachers would indicate some activity in all these categories. This chapter, however, is not organized around the five categories. In fact, this chapter is not limited strictly to "research" literature, because there is such an obvious discrepancy between what schools and students are actually using and what is being formally researched. This decision to look beyond the research reports, to view the research against a larger picture of great changes in demands for print and other materials, is an absolute necessity for a true appraisal at this time. This is especially important because the secondary school program, buildings, facilities, and organization have been the major focus for changes in American educational practices. (70) Most of the big popularized curriculum reforms were aimed at the secondary school curriculum. (21, 35) As shall be repeatedly mentioned in this chapter, these fundamental changes were put into motion, not on the basis of researched findings, but on the basis of felt needs, the common sense gained in professional experience, and hunches about strategies for innovation. (5,18,46)

Thus there is a great volume of literature on secondary school utilization of printed and audiovisual materials. Most of this literature is aimed at convincing the reader to make more or better use of the instructional materials or media potentials; and this "you-ought-to" type literature falls mainly into two types. One type, which is a common fare in the periodicals for classroom teachers and administrators, tends to describe specific successes or cautions based on instances of actual use. Another type, which is typical of audiovisual textbooks and broad guidelines in utilization, readily enunciates principles for utilization which are supposedly grounded in research, but for which the documentation for the research is not easily traceable. Illustrative of the shortcomings of this latter type is What Research Says To The Teacher: Audio-Visual Instruction, Number 28 in the National Education Association's series of pamphlets on what research says. (73) In the limited space of the pamphlet, Paul Wendt generalized broadly, and his selected references for further reading were mainly available textbooks with more elaborate explanation but little documented research. Evidence of improvement in the specificity of research documentation, in this type of overview, can be seen in a more up-to-date review by Lumsdaine in The Handbook of Research in Teaching (43) or in the special review of the use of programmed instruction, reported by Schramm (66).

The Limited Research Belies the Current Importance of Materials for Schools.

A reviewer of the literature of school use at the secondary education level cannot help but conclude that published research on the use of printed and audiovisual materials does not truly reflect the dynamics of ACTUAL use and development. The limits in space and purpose for this chapter do not permit the discussion of these rather obvious conditions or developments in United States' secondary education; but any appraisal of available or needed research must be viewed more broadly in the dynamic context of these changing forces:

(Some obvious, readily apparent, easily observed and usually non-researched conditions in secondary schools today which must necessarily influence future developments in print and audiovisual usage and the research thereof.)

--the bulk of literature for educators aimed at professional improvement is NOT research oriented; and the small part that is supposedly research based, is reported in highly generalized terms; and another large part, which might be upgraded in the future to a practical type of "action research" (17) is anecdotal reporting and sharing of discrete instances of trial or success with a specific practice, material, or instructional setting and organization.

--the strategies for rigorous research seem to be accepted as appropriate for the IMPORTANT long-range problems; whereas strategies for demonstration-implementation of an innovation (5) seem to take priority for the URGENT or immediate problems.

--the print form, especially in the random-access format of paged books or paper sheets, is so versatile and accultured into modern living as to be generally recognized as the Trojan horse of the media field--the readily acceptable container that opens the gate and to which other media cluster for entry.

--the whole AUDIO dimension of man's artifacts, especially in the format of prepackaged stored stimuli of an audio nature (phonograph recordings, tapes, radio, television, sound film, video tape), has already become an integrated part of man's communication outside the school; and thus students come to the secondary school already with a readiness for use of audio communication in this form (50,51) that is typically not a major part of the communication systems of the school or its libraries.

--ALL new curriculum reforms in their stress upon compression of information to the big ideas and central structural concepts are calling for new instructional materials
...that are families of materials, or multimedia
...that require direct student interaction

...that imply that each student is a class of one, and therefore entitled to discrete attention to his own continuous progress

--NON-GRADEDNESS, continuous progress, and a greater concern with specification of pupil behaviors and a sequencing of behavioral standards (a rather radical change in scheduling whereby the standard of performance is held constant and the length of time varies greatly as is necessary for individuals to reach the standard) is making headway not only in gaining attention (35:153-81, 371-401) but also in having an impact on production of multilevel materials and a whole new cluster of diagnostic tests and self-managed materials and equipment, including exploration with computer based instruction.

--TEACHER RE-EDUCATION for new ROLES with media and materials in the new curriculums and with new school organizations is increasingly becoming a part of school introductions of team teaching, flexible scheduling, the new mathematics, etc. This takes the form of provision for "lead time" and subsidized study, often during the summer, to implement new practices, materials, or innovations; and this practice is especially evident in the NDEA institutes for re-education of experienced educators, in the new federal assistance to schools for planning school reforms.

--GOVERNMENT assistance directly to schools is monumental in its attention to materials, media, and their use, when seen in terms of what was typical of United States schools previously. The emphasis is of course broadly on good education for all; but in this emphasis it is easy to see a strong three-pronged support for instructional materials--at least $100,000,000 for materials in Title II, plus massive support for research and demonstration, plus heavily subsidized re-education programs for teachers in institutes richly equipped with new materials and media.

--Education has become truly BIG BUSINESS, with estimates placing the $50 billion education industry second only to the near $60 billion defense industry; and the most evident recognition of this fact is the way in which industry/business has moved into production of materials (IBM + SRA; GE + Time/Life + Silver-Burdette; Xerox + Basic Systems + Weekly Reader; etc.) and directly into contracted instruction for the U.S. Office of Economic Opportunity. Among the implications are the development of "services for sale" and leasing as well as production of items for sale.

--And, unfortunately, the absence, in most of these developments, of genuine mutuality as far as media personnel are concerned in the development of the new materials and services.

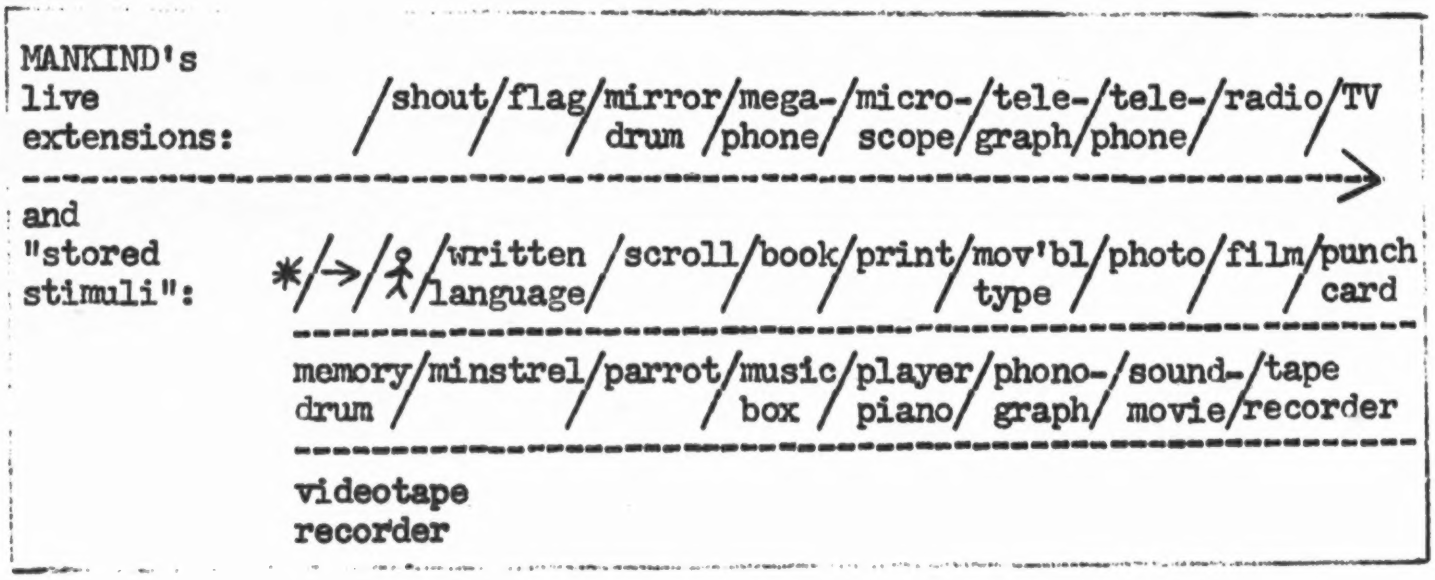
Only a little research on secondary school materials is up to date with the impact of these forces; and ironically much of the pertinent government-financed media research is inaccessible because of inadequate systems of dissemination.

Instructional Materials: For What Purpose?

So much of the literature on school usage is descriptive or argumentative. In general the surveys or studies do not differentiate the needs of secondary school students. Though conservative enough, the textbooks on instructional materials and educational media are still far ahead of practice. Until most recently the books on secondary curriculum development almost completely neglected instructional materials and new resources. And as Huebner noted in his report on research in the elementary school, much of the controlled experimentation with materials and media is designed for comparison with "traditional" instruction. Much of the activity is akin to what would be expected of an established maker of kerosene cans in search of new content and customers to use his old containers. Since media serve a go-between function, it seems important that for a beginning point we back away and question the whole purpose of instructional materials in the broad context of human development.

The purpose of education is human development. If we accept the premise that education should be humanizing, then each learner should experience instruction that is designed to liberate his potential. The horizon for human development is continuously moving forward to reveal new vistas. Essential in this revelation are new tools and subsequent new tool relationships for learning. Figure 1, below, suggests the unfolding nature of Man's significant use of audio and visual tools and of "stored stimuli" packaged as art forms and communication stimulants.

Figure 1


MANKIND's live extensions:
/shout/flag/mirror/mega-/micro-/tele-/tele-/radio/TV
drum /phone/ scope/graph/phone/
and "stored stimuli":
*/→/
/written language/scroll/book/print/mov'bl type/photo/film/punch card
memory drum/minstrel/parrot/music box/player piano/phono-graph/sound-movie/tape recorder
videotape recorder

In their totality Man's amplifiers may aim at all the senses--seeing, hearing, feeling, smelling, tasting. The instrumentation for "storing stimuli" differs not only in kind but also in different degrees of reality, substitution, compression, simulation and accessibility. Much of this variety is evident in the kits of materials required by the new science, mathematics, and motor skill courses in secondary schools. Figure 1, however, gives special attention only to audio and visual developments. On one level in Figure 1 are the "live" or non-residue amplifiers for communication. On another level are "stored stimuli" and their media which are of a visual nature. At the next and usually later level are the instruments for "stored stimuli" of sound.

An overview like Figure 1 can be helpful in emphasizing the continuity and cycles in Man's probings for new meanings and technology for information storage and retrieval. For example, the accessibility of printed stimuli was revolutionized when the random access afforded by pages in book format overcame the rigid linear confines of the scroll. Much later the printing press, moveable type and mass production popularized print as a way of life. As another example, consider the microscope, around which was built the laboratory method--still an essential method applied to other learning tools. The development of mankind is interwoven with the development of teaching-learning instruments and materials. Thus we should rightly expect the instructional materials and equipment of a secondary school not only to keep apace but also to be a part of the process for developing the new instruments and avenues for learning and living. (29,62) Much of the survey literature evidences a cultural lag. (26,33,5)

Without access to interaction with the modern learning and research tools or their substitutes, or with his attention and time diverted elsewhere, a student is in fact handicapped not only by what he has not learned but also by how superficially he is learning how to learn. Students, whether pupils or mature scholars, learn by producing their own instructional materials and simulated devices. Make-believe in the nursery, cardboard windtunnels, paintings, notebook summaries, do-it-yourself construction kits, student-made films, reports at science fairs, discovery projects at any age level: in all this there is a use of materials that puts the student in the role of MAKER rather than a mere receiver of someone else's packaged stimuli. And until recently this use of print and audiovisual materials for discovery tools was not highlighted in the literature.

Courses built around tools? Yes, the new curriculum reforms are doing just that: building curriculums around the things that students must use in discovering relationships. In subject areas like the sciences, mathematics, and languages the tools and language of the disciplines become the instructional instruments and materials. In a field like social studies the concept of tool development itself is given special attention as being essential to the humanizing process.

For example, in his description of "Man: A Course of Study," which represents one of the curriculum studies in the social studies, Jerome Bruner identifies three central questions:

> What is human about human beings?
> How did they get that way?
> How can they be made more so?

"The five great humanizing forces," writes Bruner, "are, of course, tool making, language, social organization, the management of man's prolonged childhood, and man's urge to explain." (8) In the course described by Bruner the students will work with tools, produce tools, and experience "the manner in which tools represent a selective extension of human powers."

Note that this view of tools as humanizers requires that the learner have experience in producing the instruments. Applied to the use of printed and audiovisual materials in secondary education, it begs three questions.

- --To what extent is the production of instructional materials by secondary school STUDENTS being stressed as an essential learning experience? (Until recently, little mention of this; as contrasted to new emphasis on self-selection.)
- --To what extent is the production of instructional materials by pre-service and in-service TEACHERS included and stressed in teacher preparation? (Since the decline of the normal school, this activity was given little attention, until recently.)
- --To what extent are schools prepared for the LOGISTIC SUPPORT required for local production? (A question that needs new standards.) (24)

These are important questions that now need to be asked, in view of new curriculum reforms that stress a more free interaction of students and things. Instances of such student or teacher productions are seldom researched for the transferable learnings established in the producer. When they are reported it is usually in the notes or second-class sections of professional journals, reported in a version stripped of pictorial illustrations and excitement. The impact of things and production with them, as stressed in the new curriculum reforms, should generate a new focus and type of literature about school use of instructional materials. Unfortunately, the weight of the current literature on school utilization of printed and audiovisual materials is almost entirely biased toward an image of the student as a receiver, a recipient to be managed--seldom a creator, or a designer with media and materials.

Justice for the individual learner. If tools and their use provide a selective extension of human powers, then each student has his right to learn, and the school must be just in matching its resources to individual differences.

Moral and instructional concerns for the individual--the need for a personal sense of direction in a democratic society--take on increased importance and new solutions with the complex explosion of new knowledge and techniques. "The essence of the curriculum," says Phenix, "consists not of the objective lessons to be learned and courses to be passed, but of the scheme or values, ideals, or life goals which are mediated through the materials of instruction." (60:18) Huebner has pointed out that if we talk of school in such moral terms, we must insist that schooling will (a) "be just in the treatment of ideas and just in the treatment of children in school; (b) serve students rather than compel them to fit into ordained programs; (c) be vital, ever changing, rather than static, bureaucratic, routinized." (15)

This means that every secondary school has an obligation to each of its students to fulfill his right to learn. Much of the recent new theory, research, and materials production is designed to facilitate diagnosis and personalize curriculum building. It is significant that in recent years a goodly number of strategies or resources have been associated with the possibility of improved attention to individuals: (31,32,43,55) computers and data processing, continuous progress and non-graded programs, more use of specific behavioral objectives, team teaching, self-teaching and multi-level kits or sets of instructional materials, independent study and varieties of learning space, mass media systems combined with individual information retrieval systems. (70)

Each student has his own selection and compression system for his learning. Regardless of the stimuli for learning which someone has packaged into materials or arranged in his environment, the human is always a selector of what he attends to. Thus each student has his own system of information compression--trimming his world to where he can manage it. And teachers intuitively help by underscoring a line here, representing a complicated movement with a simple stick figure, etc. A student has his external storage system--notes, reference, etc. As Travers points out, what is needed is not a flooding of the learner with information and a stress on realism" but "a set of principles which will indicate how information can be most effectively compressed and simplified prior to transmission." (69)

The complexity of individualizing instruction is well illustrated by a study of individualizing instruction through pacing, conducted by Gropper and Kress, using two 100-frame science programs with two groups of eighth graders (N=252 and 356). This study is filled with findings, implications, and problems for tailoring instruction to individuals. The learning styles, motivation, and pacing habits of students cover a wide range; yet fixed-paced presentation can be more effective than self-paced instruction if program speed is suited to the learner. This tailoring not only requires a variety of programs and pacings, but the analysis of empirical data from student performance records. (39)

Obviously the complexities of finding the right fit of any instructional module to an individual or group of students become increasingly more involved, yet there is an optimism which this reviewer attributes not so much to the tools themselves but to uses of new tools:

--more emphasis on specific behavioral objectives (made possible by better ways of recording, reporting, and illustrating a wider range of human behaviors)

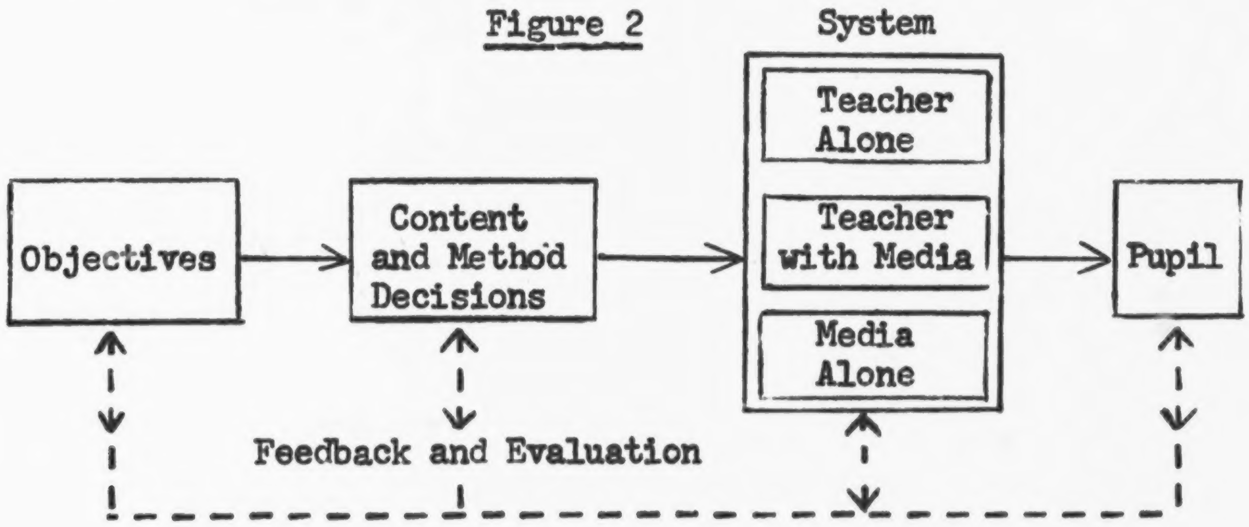
--more attention to a variety of unified programs which provide a pluralistic or grid-like set of alternatives (made feasible by the great number of like-minded learners and the possibility of high speed data processing of student performance records to provide an empirical basis for individual sequencing)

--more responsibility and skill for the learner as a self-selecting and self-managing director of his learning (made workable by student-controlled information retrieval systems and individual work kits)

The major question here for teachers is not so much is it possible, but where is such a system in operation? Where can we see what students do in a complex individualized system and what do they look like when they are doing it? Where can we see the roles that educators must play in such a system? in its conception? in its launching? in its operation and maintenance and interpretation?

Many suggestions for change recommend a systems approach combining the resources of the learner, teacher, and media with or without teacher. Any such system must be sensitive to the progress of individual learners. The NEA Department of Audiovisual Instruction visualized the relationships in this model. (30)

Figure 2



The new curriculum reforms, about which much will be said later, and the developers of educational facilities and buildings also speak of systems. The question can well be raised about the compatibility of the proposed systems, the interchangeability of materials, the re-education of personnel. What leadership roles, if any, should the instructional materials specialists of the secondary schools play in this development? (1,7,30,39,42)

What Instructional Materials Do Secondary Schools Use?

It takes but a few minutes in any secondary school to conclude that the most commonly used instructional materials are textbooks. It might take a bit longer to observe that in most of the classes and school activities the instructional strategies are either dictated or circumscribed by the textbooks. Even though the volume of secondary school classroom communication is mainly teacher talk (3), the pay-off on the exams that count is most likely based on printed matter, much of which gets attention as homework. The instructional procedure is basically assign-study-recite-test (and re-teach). Thus, for most students the freedom to learn with modern media is really limited to a few choices.

The most significant area of recent development has of course been the audio dimension by which man can store and package audio stimuli: phonograph, sound film, radio, telephone, amplifiers, tape recorders, television, videotape. Less radical but more accepted in the print-and-read tradition are copy machines, microfilm, overhead transparency projectors, and most recently microprint (100 pages to the sheet) and microreaders.

A most interesting aspect of the surveys and research of school use of instructional materials is the almost complete inattention to phonograph records. This absence will be evident in the surveys reported in the following paragraphs. At the request of this reviewer, Max U. Bildersee, editor of Audio Cardalog (the system of library card annotations of educational recordings) and editor of the "Audio" section of Educational Screen and AV Guide, was unable to identify any recent research survey of school use of such records.

Why did the innovation of disc recordings NOT catch fire for extensive school use? The equipment for use is available in most homes; equipment accessories for individual or group listening with earphones are well developed; there is good visual control of the location of the sound form (as contrasted to tape recorded sound); the variety is great and cataloged; and the production cost for a two-sided LP record when mass produced is so low, at less than thirty cents, that it could be treated as an expendable item. In view of professional and lay concern about non-readers, and the gigantic out-of-school expansion of the disc industry, why have schools failed to exploit this medium? Have school libraries and library services crystallized their functions to the limits of printed pages? Have school administrators conditioned themselves to the confines of books and print duplication in their materials budgets? Why haven't teachers insisted upon having available at their discretion for use a whole inventory of prepackaged audio content, much of which is commercially available? (61)

Research into this inattention to record utilization may prove to be productive in a variety of ways. It may pinpoint some forces, attitudes, conditions that dampen innovative sparks, generally, in the materials field. For one thing, it may show how the developments in medium are not known by educators if that medium is not an everyday communication channel for the school. In fact, the high costs of records in a music store may have misled schoolmen from the reality of truly low cost mass reproduction. Thus renewed research attention focused on disc recordings (or push-button-access-to-sound-recording) may give recorded sound a timely late-stage booster thrust in this new age of transistors and plastics.

To some extent, much the same can be said about radio--especially in view of recent developments in transistors, size, cost, portability and strength of receivers and innovations in broadcasting units. Related are various types of walkie-talkies, and increasingly more instances of their use in schools.

Interestingly, telephonic instruction or teaching-and-learning by telephone receives relatively more promotion (but no more research activity) right now as an innovation--possibly because there is an established investment in the rent or leasing of the communication channel.

One fact is clear in all the survey research: the place of print and especially the printed page is secure and central in the secondary school program.

In 1962 over 800 representative secondary school principals were sampled in a nationwide study of school practices and expectancies. Asked to rank the usefulness of various resources to secondary schools, the principals gave the top rank to textbooks, except that by 1965-66 they expected locally produced curriculum materials to be the most useful. (54:24)

Sources	Rank Order Estimated Usefulness of Various Resources During the Years 1955-56	1960-61	1965-66
Textbooks	1	1	2
Curriculum materials prepared by school faculty	2	2	1
Courses of study and curriculum guides prepared by state department of education	3	3	4-
Local workshops and curriculum study conferences	4	3	3
National studies by various subject areas (e.g., math, sciences, etc.)	8	5	4-

When these same principals were asked for their estimate of their secondary school use of instructional innovations, they indicated that films and filmstrips were most frequently used, with the greatest actual and expected increase in the use of tape recorders. (54:20)

Amount of use	Films and filmstrips	Language laboratories	Tape recorders	Teaching machines	TV programs
1955-56					
Much use	24%	-%	6%	-%	1%
Some use	72	6	70	5	17
None	4	94	24	95	82
1960-61					
Much use	58	9	33	1	3
Some use	41	26	63	12	48
None	1	65	4	87	49
1965-66					
Much use	75	40	60	10	21
Some use	24	43	39	55	65
None	1	17	1	35	14

Asked to judge the degree of teacher acceptance of these instructional innovations, the secondary school principals reported positive acceptance in 32% of the schools, lukewarm acceptance in 63%, and negative attitude in only 5%. The small secondary schools reported a higher positive response (38%) than did the larger schools (24%). (54:22)

Also reported in 1962 was the nationwide Survey of Staff Utilization Practices, conducted by the National Association of Secondary School Principals. In this study, which did not survey sound film and filmstrip projectors, the most systematic use was reported for tape recorders (50%); overhead projectors were next most frequent (20%), with television viewing only a little less and more concentrated in specific subject areas. Reading accelerator machines were reported in 20% of the English programs. (68)

A common complaint of teachers is the shortage of materials and equipment. A 1965 telephone sampling by Trendex, asking elementary teachers how they would like to spend new school aid, indicated that new instructional materials was at the top of their list. (38) But it is likely that most teachers still think in terms of print. In Godfrey's study in 1961 of 11,531 teachers and 572 schools in 250 districts, she concluded that "the basic equipment is available for use in their building. Yet the majority of them do not use audiovisual media extensively, nor do they plan to do so in the near future." She also found that the use of media was related to the kind of subject matter taught. Godfrey's data did not distinguish between elementary and secondary school teachers. (33)

The shortage of instructional materials is often locked in a hen-and-egg type argument: should materials or equipment come first? The question of course is further complicated by what is the subject matter of the material and how is it to be used. Other things being equal the argument ideally ought to be in favor of accessibility. It is interesting to note that when youths are asked, "Which medium would you miss most if you had to do without it?", the response is overwhelmingly to those media which operate at the turn-of-a-switch and are recent. Thus in his 1958-59 interviewing, when Schramm asked the question he secured these results. (64:78).

Which Medium Would You Miss Most If You
Had To Do Without It? *

		Boys			Girls		
Medium	Grade:	8th	10th	12th	8th	10th	12th
Books		6%	5%	5%	7%	6%	13%
Magazines		4	2	2	0	1	2
Newspaper		5	11	20	4	3	11
Comic books		3	1	0	2	1	0
Television		71	58	33	61	45	38
Radio		4	17	32	22	39	33
Movies		3	5	4	3	3	4

* No answer from about 3% of the children.

Many educators feel that teachers have had too little opportunity to experience easy accessibility and control of media. Whereas Godfrey's report concluded that the problem was more than a shortage of equipment (33), the Finn-Perrin-Campion study, reporting on equipment up to 1962, takes a strong position that a major bottleneck is too little investment in technological equipment. This study assumed that software--the materials--was in existence or could rapidly follow the presence of equipment. Included in the report was data on the increase in the number of 16mm sound motion picture projectors, still projectors of all types, sound reproducing equipment, recording equipment, broadcast reception equipment, cost patterns and overall investments in audiovisual, and a computation of prorated availability to teachers. There are comparable tables including data from the Godfrey study and from several technologically oriented school systems. Also included was a reasonable estimate of minimum equipment needed in schools, even when there was no change in current instructional strategies. (25)

But standards like those set by the Finn-Perrin-Campion study are soon out of date. Standards for audiovisual personnel and equipment are regularly updated by the Committee on Professional Audiovisual Standards of the NEA Department of Audiovisual Instruction. The guidelines for secondary schools are different from those for elementary or higher education; and there are three levels of standards: weak, good, superior. (37) By 1965 the Finn-Perrin-Campion standards are not good enough.

The textbook is still king. In Text Materials in Modern Education, Schramm was able to say in 1955 that "95 percent of the text time in American public schools is spent on print and that 90% of this printed material is in the form of textbooks." (19:143) Writing in 1963 Redding could still write: "Culturally, textbooks may be the single most significant influence in the country today." (63:5) Redding was analyzing a "revolution" in textbook publishing; but the change was not so much in the importance but in the preparation of texts and the supplementary materials. Olsen also listed and predicted a similar list of changes. (58) When the scholars in the new curriculum reforms began preparing materials they made it obvious that the current textbooks were inadequate. The textbook might remain the key member but it was to be central for a whole family of interdependent instructional materials and media. The cost of such production was beyond the resources of many smaller publishing houses. With money from government and foundations, and with much realignment in the textbook industries, the new courses of study took shape--usually organized around a text. For, as Redding says, "a standard definition of a textbook is simply 'a course of study in print.'" (63:19)

More will be said later about the new curriculum study projects and their materials production; but at this point it is important to note that the texts for these new curriculum movements not only required a re-education of the teacher for proper utilization; in several cases the curriculum reforms were funded by government or foundation to subsidize the retraining of teachers on a mass scale. Thus Redding noted that there was a tendency to reduce the alternatives down to "one kind of course, one point of view, one methodology, one set of materials" and conceivably one course in a discipline. (63)

Data from the Annual Survey of the Textbook Publishing Industry can document the increased production and investment in texts. The investment in other books for the schools, as might also be documented by "Annual School Library Statistics" in The Bowker Annual, is increasing, but the per student investments in printed matter fall far below standards of expectation, as do the investments in audiovisual equipment and materials.

Textbooks themselves are not often the focus of research; but with the introduction of programmed instruction and programmed texts, this conditioned changes--with the programmed materials having to prove themselves in competition with a so-called traditional approach, most likely textbook oriented.

Actually many of the predictions about the volume of programmed text material and machines have not been realized. In fact the upward movement of titles from Programs, '62 to Programs, '63 will not be continued in Programmed Instructional Materials, '64-'65. (12) The production of good programs is a much more demanding process than may have been realized earlier; and now the larger companies are replacing the many independent producers who were early in the field. But most important is maintenance of the research emphasis in textual materials and strategies that was introduced and continues to be demanded by programming. (32)

Programmed instruction has seemingly stimulated a great deal of research with instructional materials at the secondary school level. The secondary school subject matter was most evident in the programs listed in Programs, '63, about 20% being aimed at the junior high school. This same emphasis is put on the secondary school level in Schramm's bibliography listing 165 research reports on programmed instruction. Almost 40 of the studies were researched with learners and materials at the secondary school level. Most of these studies involved experimental and control groups; analysis of variance was the most common statistical treatment. About half the research dealt with the subject matter of mathematics, some with English, foreign language, and science; for some the subject matter was logic, games, or unusual learning tasks. The research in about half the studies was concerned with presentation variables--prompting, confirmation, branching, pacing, size of step, machine or text format, programmed television or film instruction, etc. About one fourth dealt with response modes. A half dozen compared learning from programs with results from conventional teaching. Programmed films and programmed television are the media in four high school studies. The most consistent thing about the research is that students can learn from programs. Beyond this the studies are not so conclusive. Nevertheless the whole body of research and the accumulated information about the complexities and guidelines of presentation patterns and individual differences would indicate that this research will eventually improve all materials and learning from them. (66)

There is, however, no accurate picture of its school use at this particular time. Although programmed instruction is regularly mentioned among the promising new developments, there has been no major survey of school use of programmed materials since the 1961-62 school year, when 2,000 of the 15,000 U.S. school administrators reported 436 program usages in grades 7 through 12. (13)

Paperbound books have gained a wide acceptance. Hundreds of articles have been written about the advantages, availability, and instances of successful use of paperbacks. This acceptance was without formal research; for example, when nineteen references are made to secondary school usage in *Paperbacks in Schools,* they are isolated instances of teachers' or students' use. (9:135) A recent statewide study in New Jersey was designed to supply data on durability, costs, handling, and impact on curriculum. (56) Coordinated by the New Jersey State Department of Education with the cooperation of the American Book Publishers, this study in 1964 involved 30 high schools, 10 junior high schools, and 10 elementary schools--a total of 316 classes, 187 teachers, and 40,000 contributed paperbacks. Representatives of the participating schools convened to define questions and to agree upon record-keeping and anecdotal reporting. At the end of the year three questionnaires were completed by students, teachers, and administrators, respectively. From the data obtained the study reported eleven general implications and twenty specific recommendations. The following illustrate some of the specific recommendations.

Number	Recommendation
3.	In the junior high school and high school, each homeroom, study hall, and subject area class should contain an extensive paperbound book collection. (Note: without minimizing the growth and development of sound central library facilities.)
4.	...a $4 per year per pupil expenditure for paperbound books would be normal.
11.	Free reading should not be graded.
17.	School budgets should be flexible enough to allow teachers to order paperbound books for classroom use when and as they are needed.

18. Colleges of education should help teachers-in-training understand the consequences of the "paperback" revolution.

19. School systems should make provisions for the kind of in-service education that will help teachers learn how to make the most of paperbound books.

This study also reported these findings from the teacher questionnaire.

77% of the teachers had previously used paperbound books only occasionally and
16% had used paperbound books not at all.
82% reported a change in their attitude toward literature.
86% reported some change in their teaching methods.
75% reported some degree of curriculum change.

"Magazines in the Classroom" is the title by which the NEA Research Division reports a 1959 survey of representative teachers on their classroom use of magazines. (44) The teachers claim a variety of advantages for magazines: current content, great variety of material for meeting the wide range of individual differences in ability and interest, comparative magazine study as helpful training in critical and evaluative thinking, ready stimulus for imaginative classroom projects. The expendable nature of periodicals invites their use as source material for bulletin boards and student scrapbooks. Secondary school teachers reported teaching special units on the use of magazines. It was recommended that an Abridged Reader's Guide should be available in each school library. Reprint services were mentioned as being very helpful. A general conclusion cited "the ingenuity and resourcefulness of the teacher" as the real key to effective use.

Newspaper use in schools is seldom surveyed; however, Schramm reports developmental stages and general newspaper reading by young people in Using Mass Media in the Schools. (65)

Mass media in the schools, except for television, is more likely to be described than researched, as far as secondary school educators are concerned. In a report of the National Council of Teachers of English, entitled Using Mass Media in the Schools, in the section called "What Teachers Are Doing" are nineteen short chapters, each describing a unit or procedure by which a secondary school gives instruction in one or more of the various mass media: books, comics, magazines, newspapers, recordings, motion pictures, television, and radio. (4:113-270)

Television, like programmed instruction, has stimulated considerable exploration and various kinds of research, usually comparison with traditional instruction. These range from system-wide efforts like that of Washington County, Maryland (6), to neat studies of classroom viewing--

which often turn up surprising findings, like one in which Westley and Severin found that in a study of 244 ninth graders viewing algebra instruction there was a positive relationship between more distance from the screen and better scores. (75) Much of the reporting of use of television is descriptive of its use as a transmission system; but much of the research, as will be mentioned later, is highly productive of insights into changing roles for the teacher, and for teacher education.

Language laboratories, more than the general use of tape recordings, has prompted considerable research, much of it controversial whenever there is doubt about the competencies of the teachers involved. Hocking has a major report on the subject. (41) His monograph includes illustrations and short descriptions of some representative language laboratories in secondary schools, and selected reports by specialists. He reports his surprise that when he polled 48 foreign language supervisors, 42 reported that the most serious handicap to the success of language laboratories in their high schools was "teacher's lack of special training." This was surprising in view of the fact that at least 10,000 language teachers had already been retrained in NDEA foreign language institutes. Eddy has commented on the same problem quite colorfully. (22)

> "The teacher who has a language laboratory is easy to identify. He can be spotted immediately with the goods. But it is not so easy to pick out the teacher who is fully aware of the dimensions of the methodology and linguistic revolution and who takes his full part in it. ...Unless his teaching and linguistic skills plan and guide the use of the machine, all our electromechanical improvements will be ineffective."

Kits or sets of self-instructional materials, some of which include self-administered pre-tests, individually-managed record books and progress plans, and a great number of instruction sheets--like the Science Research Associates "Reading Laboratories" and the Follett multilevel sets in literature--have seemingly become widely used in secondary schools. Although the precise number is not known, one estimate places the figure at 8 million student record books in secondary schools, for multilevel materials.*

Electronic student response systems and computed based instruction are not prominent except in several research (32:162-367) reports or explorations. The implication from some of the research in programmed instruction has highlighted the potential use of computers for programmed instruction; but there have been other ways in which the response systems have been used to make immediate improvements, based upon "feedback" from the learners as they interact with instructional materials. The Bureau of Classroom Communications, New York State Department of Education, for example, used electronic response systems whereby students could indicate continuously whether they believed they were learning at any moment. These student ratings provided a "learning profile" by means of electrical summating equipment. The ratings were summated every 30 seconds. By this means a ninth-grade year course in algebra and another in science were "improved by evaluating each lesson using learning profile student rating techniques and introducing into the second class new educational media which were found to be effective." The improved lessons were evaluated by the same technique. A control group with traditional instruction was part of the research design. An analysis of learning peaks in the algebra course and the science course shows considerable subject-matter differences: for example, in science the most effective classroom activity was the motion picture film, next teacher demonstration, then chalk writing; in algebra, top rated was chalk-talk (28%), overhead projector with grease pencil (26%), overhead slides (17%), lecture (6½%), motion pictures, films, filmstrips, kinescopes, individual study (2%). (14,71)

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* Estimate provided by Don H. Parker, Multilevel Learning Materials, Inc.

The possibilities of such analysis combined with the analysis of pedagogical moves as utilized in Bellack's study of Language of the Classroom is truly exciting. (3)

Another unusual application of data processing with special interest to instructional materials specialists was an exploratory study by Miller with 56 high school teachers over a 20-day period to develop a method of using electronic data processing for rapid identification of operational barriers to utilization of selected audiovisual materials. A tally of 1,025 uses revealed that 1,627 barriers were encountered, averaging 1.6 barrier per use. Data processing was done with a 1401 computer. "The ten most frequently occurring barriers for all media were in descending order: seating arrangement, screen placement, condition of equipment, electrical cords, room acoustics, lack of preparation time, operation of equipment, use of screen, focusing, and hall noise." (47)

Physical space for learning is being subjected to the same kind of innovative thinking as characterizes the curriculum revolution. Flexible time schedules, large and small group instruction, the idea that different kinds of learnings require differences in space, and new media and materials for self- and group instruction: these considerations have prompted administrators to design schools for the new media. (2) And with these changes there is always insistence upon more and better use of instructional materials. Team teaching, according to Bair and Woodward, makes "increased and more productive use of mechanical and electronic aids in the learning process when the teacher's time can be saved for more advantageous purposes and the pupil achievement is at least equal to that resulting from a more traditional approach." (2:24-25)

In his description of the non-graded high school at Melbourn, Florida, Brown gives two chapters of his book to the new role of the library and new provisions for independent study. The library must rearrange its facilities, according to Brown. "Both the number of seats and number of books (in the library) will have to be increased by from 40 to 60 per cent. More of the school's budget must go into books for the library and less of the budget into textbooks." (7:104) Brown believes that libraries will need to seat from 25% to 50% of the school enrollment at one time.

In view of such expectations, Ellsworth and Wagener prepared The School Library to indicate what the implications mean for a secondary school library being built today. (23) Typically the proposals for continuous progress plans in schools call for an instructional materials center that renders service and is equipped to a much greater extent than is present practice. (16:9)

What is the Most Likely Source for the Big Thrust that will Effect Major Changes in Instructional Materials and Educational Media?

In the opinion of this reviewer the present picture is very clear: the discipline-oriented curriculum renovations are changing the status of instructional materials (making them central to learning through exploratory activities) and their accessibility (giving more control to the learner).

This change has been put into momentum without a basis of research or experimentation to support it, and with rather little help from the old-line curriculum builders and the communication specialists.

It is as if the old-line curriculum specialists had created a vacuum with reference to instructional materials into which the new curriculum innovations could rush. It may surprise some curriculum specialists to realize how generally neglected, until very recently, were libraries and instructional materials in their curriculum textbooks. A search of the indexes of fifteen recent textbooks on secondary curriculum revealed only one that had as much as two chapters on instructional resources, including the library. None of the other fourteen had a full chapter on materials or resources. Although four did have from eight to ten pages total for library and all instructional materials, most did not even include "library" or "instructional materials" or "teaching aids" or "audiovisual" in their index. The secondary methods books are not much better.

A dozen such methods books show that before 1963 from ten to forty pages sufficed for the library and instructional materials; since 1963 the secondary education methods books devote from fifty to over a hundred pages to library and instructional materials.

This failure of the earlier curriculum makers to perceive instructional tools as humanizing and to insist upon their humane use not only gave us a bad system but a residue of frustrating attitudes. It is ironic that because of their very avoidance of instructional materials, many professional educators with a long history of specialization in curriculum building now find their leadership usurped by subject matter specialists constructing materials and equipment.

What the subject matter specialists began, with their fresh and direct approach to the tools and things for learning, now has the support of the established professional organizations. Thus the Project on Instruction, in the course of developing several position papers on modern instruction, in one of its publications refers to the library or materials center as "the heart of a school's instructional services, pumping life-giving blood to the entire educational organism." (52:125)

It is significant of the recent change of attitude toward instructional materials that six of the thirty-two recommendations of the NEA Project on Instruction deal directly with instructional materials and their management; and in addition there are recommendations on vertical organization of the curriculum, non-grading, continuous progress, and personalized diagnosis and curriculum planning which are impossible without new materials and better accessibility. (40,51,52,53)

The position of the federal government and resources made available through federal aid are also in the direction of giving more support for the needed materials and media. For example, a three-prong approach is evident in moneys for research, moneys for materials and equipment and facilities, moneys for teacher education (as evidenced in the NDEA institutes). With a bit more maturity the combined efforts should become even more coordinated, especially with reference to utilization of materials and media.

The following paragraphs will briefly overview some of the major curriculum reform projects at the high school level. Consistently these movements reveal a major concentration on the production of instructional materials or their selection and organization compatible with a specific course plan.

In School Curriculum Reform, Goodlad begins his introduction by noting that groups and individuals...

> "handsomely supported by the National Science Foundation... and private philanthropic foundations...have developed new courses and instructional materials to go with them for high school mathematics, physics, chemistry, biology, economics, geography, anthropology, English, and foreign languages, and for several subjects taught in elementary schools." (35:9)

In Revolution in Teaching several subject matter specialists describe briefly the progress of some of the secondary education curriculum projects.

Moishe reports that even when the School Mathematics Study Group materials were put on the market too late for any state adoptions in 1960-61, a first printing of 50,000 was immediately exhausted; a second printing ran out in a month; and in 1961-62 the circulation of the books was tripled. (21:57)

Finlay describes the (PSSC) Physical Science Study Committee as "developing interrelated teaching materials for physics in the secondary schools." Much of the demonstration is provided by films, built around experiments performed by the student and upon which there is great emphasis. Paperbacks, achievement tests, guidebooks, laboratory equipment, and a teacher's guide are coordinated with a textbook. (21:193ff)

In his description of the (CHEM) Chemical Education Materials Study, Campbell also reports a family of materials: textbook, laboratory manual, teacher's guide, films, laboratory equipment, wall charts, tests, and programmed text materials in mathematics. The emphasis is on laboratory work and principles of chemistry--discovered, learned, and applied in an experimental context. At the time of Campbell's writing in 1964 he estimated 100,000 students were using the materials. The CHEM Project, he said, does "not...press for the adoption of these materials" but encourages a school system to "look over" the materials and "compare its own needs with the CHEM Study course." (21:209ff)

The American Institute of Biological Sciences (AIBS) Biological Sciences Curriculum Study is identified by Glass as emphasizing both the materials and the importance of the interdisciplinary and college-and-high-school teamwork in the production of the course with its materials. Glass takes pains to show that the curriculum revision is never merely enrichment by material and media; rather it is a shift that gives more importance to the nature of scientific inquiry and scientific enterprise ...and less emphasis on the acquisition of scientific information and concepts of lesser importance. The project moves the student to the frontier of his knowledge "to explore a bit of the unknown and learn that by patience and carefulness, persistence to the point of obstinacy, precision in measurement, and accuracy in observation they can sometimes experience the joy of discovery. They must learn to ask the right question, that is, to frame testable hypotheses." (21:219ff)

There are a variety of reasons why this present curriculum revolution may become a permanent revolution. One reason is the fact that the research expert in the university and the high school teachers and supervisors have been talking together and respecting each other's contributions. This productive relationship prompts Glass to say, "Never before in American education have we seen a large number of research scientists from the college and universities, taking part in a cooperative effort with high school teachers of science and science supervisors to replace an antiquated body of scientific knowledge and outlook with subject matter and perspective that are truly current." (21:230)

Much of what has been taking place in mathematics, foreign languages, and sciences is now underway in English, linguistics, history, and social studies. (21:171-310) But it would be a gross misrepresentation if this emphasis on production were to becloud the even greater concern with the importance of the climate for learning and the help which teachers may need in creating that climate and facilitating student exploration.

For one thing, the projects underscore the fact that the teacher cannot learn for the student; nor can the instructional materials learn for the student. To learn a process one must participate actively in it. (21:225) Thus the materials and instructional settings are being restructured to put a priority and efficiency on those processes and values most worth learning. For his time and life space the learner is entitled to a learning environment and instructional system that is much more efficient and effective in self-fulfilment than our past practice.

In reviewing the resources which are available to the teacher for attacking effectively the teaching problems, Ralph Tyler lists: (a) more adequate knowledge of how learning takes place, (b) devices for aiding teaching and learning, and (c) the most important resource, the teacher himself. (21:192)

The curriculum reform projects ARE making changes in instructional materials: families of materials, accessibility, more control and self-management for the learner, etc. Four characteristics of the change are noteworthy for the instructional materials specialist.

1. Although within a subject field (like science) there are master lists of materials, there seems to be little coordination of umbrella-like proportions.

2. The changes did not come about because of research data. Except for a rather pragmatic tryout or "shake down" for newly launched courses and materials in cooperating schools, there was almost no experimental researching of one curriculum compared to another. In short, there was a sudden supply of funds, and these funds went into ideas and the production of things to implement the ideas.*

3. The changes are expensive. Although there may be human efficiency, none of these reforms promises to cost less. In fact, they warn that initial installation is more costly. (21:229)

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* On this topic Moishe says: "The point is that the design of new mathematics programs has not been guided by scientific research in any commonly understood sense of the term....pedagogy has appeared as a practical art, learned by experience....Validation by traditional tests is the handicap that new programs are expected to accept and overcome...." (21:185)

4. Obviously there is a changing role for teachers. The exact nature of the role is not always clear; nor is it clear how teachers may be re-educated for the new roles.

Insights for Research

Actually, the current research efforts with media and materials have generated a large body of new insights and hypotheses. The results of federally funded research and demonstration need better coordination and more visibility. The efforts need to be put in perspective, and continuously reinterpreted--similar to Lumsdaine's summary in The Handbook on Research in Teaching. (43) For example, while the teacher and student roles are changing radically, we already have sophisticated attention being given to the problem. Fritz and Massialas in their study with teachers in the MPATI (television) program reported the changes in the teacher's perception of role. (27) Westley and Jacobson, studying the way in which student attitudes might change toward teacher, course, and the medium, found that the "TV-taught pupils tended to rate their own teacher more highly than did the non-TV group...rated their own teachers much more favorably than they did the TV teacher...rated their exercise sheets more highly than their regular textbooks...rated their textbooks less favorably than did the non-TV group." The TV group also gave more favorable responses to the course concepts, the course, its materials, and requirements. The threat of being held up to comparison with the "master teacher" proved to be a myth in their study with 503 ninth grade students in algebra. (74) Guba and Snyder studied over 600 elementary MPATI teachers to probe the impact of new communication devices upon the classroom teacher's role. (40)

In physics classes of two large Chicago high schools, Fritz used three methods: conventional instruction; combination of teacher collaboration, variable class size, and specially prepared teaching materials; this same combination plus free access to the school's learning resources. (28) The last named group showed superior gain for students who took advantage of the free access. Among the several findings was increase in time for the teachers for regrouping students for better learning.

Also from the research with programmed instruction much is being learned that is applicable to the teacher's role when media are part of the system. Glaser and others have been conducting highly complex studies with the use of programmed instructional materials within existing classroom structures. (31,34) Campbell and others experimented with the effects of pretraining and interest on self-direction in programmed instruction. (10,11)

There is also a large body of similar research from teacher education and higher education that is applicable. The appetite for more research is insatiable (45), but we do already have increasingly refined research in audiovisual formats and sequences. (26)

But there is little reason to believe that research which focuses only on the media, format, or strategy itself when divorced from a subject or teaching discipline is an effective way to communicate with secondary school personnel. For example, a listing of 174 doctoral studies in a table in the National Association of Secondary School Principals Bulletin had no category for "materials," "audiovisual" or "teaching aids," yet nine of the 37 studies under subject areas and six under curriculum were actually studies of media variables. (48) This should not surprise the media specialist. Knowlton studied almost 1,500 math and science teachers in summer institutes, and concluded that there was no evidence that AV networks (informal opinion leadership, information channels urging use of AV resources) exist, although the data suggest that department heads are more likely to respond to messages originating from the state audiovisual supervisor than are teachers. He also concluded that the subject a teacher taught was the most important determinant relating to the formation of any such networks. (42)

The Key Word Is Involvement

The most obvious thing about school usage today is that a revolution in materials got underway without the materials specialists or their research having very much to do with it. Now there is a mutuality of need for all types of personnel to become involved.

Three of the nine recommendations made by Goodlad for implementing the curriculum reforms deal with teacher education for the performance of the new roles. (35:77ff) One recommendation is for working relationships with university-controlled laboratory schools; another is for the inclusion of pre-service teachers in curriculum reform projects; another is to involve future teachers of teachers. The key word is involvement. Applied to instructional media specialists, it is still the same word: involvement.

But involvement has three overlapping rings:

--the need to keep informed,
--the need to interpret...in the langugage of the other man's interests and problems,
--the need to be involved to learn.

In local terms this suggests that the media specialist immediately recognize and join the materials and media revolution now under way in his school. At the national leadership level it calls for (a) a compression system for recognizing, sorting, and highlighting significant research, (b) immediate implementation in a variety of demonstration centers, and (c) interdisciplinary planning and management so that the thrusts of the various groups and specialized personnel will be more efficient, more orchestral, and more truly innovative in the improvement of instruction for human living.

More needs to be known about the dissemination and implementation of innovation and of research findings. Much of the exciting research which Huebner would categorize as "engineering" or "effectiveness" research is of a government-sponsored variety and greatly in need of better visibility and interpretation to educators. There seem to be pound-wise-penny-foolish rules at work, wherein the research itself is well financed but the reports are either seriously limited or not available or permitted to go out of date awaiting publication.

Some of the "theory" research, like George Wald's hypothesis about visual excitation (72), is still in the biology or medical laboratory and a long way from classroom application. Some studies, like John Shabaglian's very exacting research with drug stimulation as the variable in learning with reading materials (67), combine medical and instructional research. Some of the research into the analysis of classroom behavior treats the instructional process as gamesmanship (3), and in fact some of the discovery activity in the new curriculum innovations--and some multilevel materials, do-it-yourself kits, and driver education--also make use of simulation; yet there is no study of simulation in secondary education that compares with the Greenlaw-Herron-Rawdon study in industry and university education. (36)

As Travers has stated in an argument for more attention to compressibility (69), the mind cannot attend to everything and it is the role of the teacher and media specialist to provide help in the screening and selection systems. The difficulty that this and other researchers have encountered in trying to get a comprehensive picture of the research of the use of instructional materials and media would indicate that the librarians, instructional materials and media specialists, and information retrieval specialists are all in great need of a combined accessible high speed system for obtaining pertinent facts and anlysis of relationships in media and materials development and utilization.

Then, too, there is need to develop experience with the problems and insights that come from putting a theory and innovation to work; and for this demonstrations centers become an urgent necessity. A major problem with materials and media is the changing roles and functions when something new is introduced. In a pluralistic society, where individual and group differences are part of its fabric, it would seem important that there be variety in the demonstrations, in the utilization patterns and in the different "naturalistic settings" (as contrasted to purely "laboratory research" studies).

For the teacher and educator and laymen there still remains the personal problem of perceiving one's self in new roles in a changing school situation. Some filmed reports like *No Bells Ring* (57) and *One Step at a Time* (59), reporting The Trump Plan and classroom use of programmed instruction, respectively, treat instructional materials in the context of the overall instructional task. But there is little systematic research on how to communicate a "feeling for" the medium and its materials. Nor is there a good diagnostic test by which educators can help judge their own readiness, receptivity, and compatibility with the various media, materials, and the assumptions about learners, learning, content organization, motivation, and instructional system built into the materials.

All of this calls for more and deeper involvement with new media.

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USE OF PRINTED AND AUDIOVISUAL MATERIALS FOR EDUCATIONAL PURPOSES BY COLLEGE AND UNIVERSITY STUDENTS

by

Richard E. Chapin

The danger in reporting on the use of printed and audiovisual materials is that we know far too little about what students use. It is likely that we know even less about why they use what they do and what effect the use has on them.

It is difficult even to isolate the types of materials that might be used by the college student. Certainly all of the mass media--radio, television, commercial motion pictures, magazines, newspapers, and books (not related to curricula)--would have to be considered. Not all of the use of the media will be for instructional purposes, but some of the use will surely fall into this category. Text-books obviously would be included in any definition of materials used for instruction. Likewise, library use should be considered because if there is one thing we know, it is that most use of library materials, if not the use of the library building itself, is related to instruction. The use of audiovisual materials is one thing if used by the instructor, but is another thing if used by the student. For this paper, consideration will be given only to use of motion pictures and other visual devices (except television), tape-recording, and auto-learning devices as used by the student for his own personal instructional uses.

"Instructional purposes" can be defined in such a manner as to seriously limit the survey. Such would be the case if Lumsdaine's definition (1963) were used:

> The word 'instructional,' as employed here, embraces many of the connotations of the terms training and education. Instruction is used as a generic term referring to any specifiable means of controlling or manipulating a sequence of events to produce modifications of behavior through learning. It is applicable whenever the outcomes of learning can be specified in sufficiently explicit terms to permit their measurement.

Or it can be defined in such a way as to expand the survey to unmanageable proportions. Tauber's definition, in his instruction to the conferees, is so broad as to include some materials that might be better left unreported: "'Instructional' is defined on a broad base to include the entire teaching and learning process in and out of school." Between these extremes of explicit measurement and the entire learning process is a workable solution: "instructional," as used here, is defined as being related to specific curricular needs of the individual student.

The concern of this paper, therefore, is what materials--mass media, textbooks, library resources, and audiovisual materials--are being used to what extent by today's college student to further his own course work.

In the following survey of student use of materials, no attempt will be made to analyze and evaluate research methodology. Methodology will be discussed later only as it relates to needed research techniques and methods. The immediate concern of the following section is to see what we know of the use of materials by college and university students.

Student Use of Materials

Mass media

The college students do make use of the mass media of communications: radio, television, commercial motion pictures, magazines, newspapers, and books. The use may not be for instructional purposes today, but that same use may well be defined as instructional at a later time and for another course. Some use is obviously instructional from the beginning: that is, when a faculty member assigns a class to attend a specific motion picture or to watch a certain television show, a phenomenon which seems to be increasing on the college campuses.

Although we know that the students do attend to the mass media, and we know from the work of Klapper (1960) and others that the the mass media do have an effect, we do not seem to have any studies indicating the amount of the audience of the mass media among the college students, nor do we know how much the content of the mass media is used for instructional purposes. There are some indications that the communications behavior of college students is quite different from that of the adult counterpart not attending colleges or universities. In the first place, the college student is more likely to spend three hours a week with television than he is to spend thirty hours or more, as is typical of the average. Also, it is obvious that he will read, although not necessarily trade books, much more than the average adult. His newspaper reading seems to be confined more to the local campus newspaper than to any other type of newspaper. His radio listening is inclined toward music rather than toward news and discussion types of programs.

A study undertaken at Michigan State University during the 1964-1965 academic year as reported by Danbury (1965) gives us some insight to the communications behavior of the college students on one campus, particularly as these habits apply to radio. It was found that the average student at Michigan State University spent approximately 24 hours per week listening to radio. This is not to say that they were not undertaking other activities while listening, but does indicate a large segment of time devoted to one of the mass media. Other aspects of the study relating to the mass media showed that the student newspaper was read by almost the entire student body each day. The rest of the daily press, however, was almost completely ignored. Although the news magazines enjoy some popularity, it seems that the typical student at Michigan State University tends to isolate himself from what is going on in the nation and the world. Perhaps they listen to the news on the radio, but in their stated preference for the type of radio program they preferred, national and international news ranked behind rock-and-roll music, folk music, jazz, and symphony orchestras.

If the Michigan State University student is typical of college students, then the use of the media as a news source is entirely different from the regular adult population. A recent Roper (1964) study indicates that in answer to the question "Where do you get most of your news about what's going on in the world today?" the responses were television 55 per cent, newspapers 53 per cent, radio 29 per cent, magazines 6 per cent, people 4 per cent, and *don't know* 3 per cent. Such figures are not typical of the college student.

In another attempt to find some information regarding the communications media of our students, a check was made of the distribution of certain magazines in the East Lansing area. East Lansing, being a community devoted almost entirely to Michigan State University, would have negligible use of newsstand sales of magazines by the permanent population of the city. It was found that 2600 copies of *Playboy* are distributed to the local drug stores and newsstands each month. *Time Magazine*, on the other hand, had a distribution of only 550 copies, per month. And *Centennial Review*, a local, scholarly quarterly, might sell five copies per month to the local newsstands. No attempt will be made to draw conclusions from these figures, but they may prove of interest in encouraging further research on the college students' attendance to the mass media.

In summary, we do not know the communications behavior pattern of the college student. He has been studied in high school, particularly for television, and he will be studied as an adult, but for the four years of his college study he remains an unknown in regard to his use of the mass media.

Textbooks

Instructional materials that have the most concentrated use, and surely the use most close related to the curricula, are textbooks. There can be disagreement with this statement only if the classical definition of a textbook is used, with the restrictive clause "organized for instructional purposes." Certainly not all of our textbooks are organized in such a manner, but in the modern sense they are accepted as textbooks. Buckingham in the *Encyclopedia of Educational Research* (1960), uses the following definition:

> . . . the textbook is a learning instrument usually employed in schools and colleges to support a program of instruction. In ordinary usage the textbook is printed, it is nonconsumable, it is hard-bound, it serves an avowed instructional purpose, and it is placed in the hands of the learner.

Even this collection of essays, if used for course purposes, could be considered a textbook.

Net sales of textbooks in our country has surpassed the half-billion dollar mark. Table I indicates the rapid rise in sales during the past few years. The increased sales reflect both on increased enrollments and increased prices.

TABLE I

TEXTBOOK SALES: U.S. PUBLISHERS

Date	Elementary High School (millions)	College (millions)	TOTAL (millions)
1945	$ 52.7	$ 20.8	$ 73.5
1950	94.3	49.1	143.4
1955	143.0	58.7	201.7
1960	230.9	106.9	337.8
1961	251.8	121.6	373.4
1962	271.3	138.4	409.7
1963	304.0	158.0	462.0
1964	325.7	183.1	508.8

Source: Publishers' Weekly, May 17, 1965.

The extent of textbooks on the college campus is made even more evident when it is realized that college students spend more than twice as much per year for textbooks than is being expended in the same colleges for library materials, including binding. The Bowker Annual . . . 1965 shows that college textbook sales amounted to $158,050,000 in 1963, while expenditures for books and library materials for 1,985 institutions (95 percent of all academic libraries) amounted to $65,000,000.

A recent issue of Publishers' Weekly (1965) reports that more than five hard-bound textbooks and two paperbound texts are purchased each year for each student. In addition, every other year the typical student will purchase one workbook. The average cost of these purchases is $30.96 per student.

The above figures are based on a careful analysis by Stanley B. Hunt and Associates for the American Textbook Publishers' Institute. They represent publishers' sales and do not reflect figures from the purchase of used texts on the college campus. At my university the cost of books and materials is estimated at "$105 per school year for students enrolled in a normal program." Perhaps a more realistic appraisal of the extent of textbooks use would be to multiply the above figures by three. In this case the average student would purchase about 21 textbooks per year.

If the above assumption is true, and if we assume that the average textbook runs to 500 pages, the typical student will be responsible for reading over 10,000 pages during the thirty weeks of his academic year. This amounts to 350 pages per week or 70 pages per day for a five-day week. If one observes students reading textbooks, it is obvious that the reading rate is quite slow for this type of material. Perhaps three to four hours per day is devoted to text reading. Is there any wonder that other instructional materials are not used as heavily as some of us might wish?

This manipulation of figures is not intended to stand up under close scrutiny. It is included only as an attempt to arrive at some sort of estimation as to how much time is spent with this particular type of instructional material. The assumptions are little more than guesses, and they have not been put to rigours of testing.

Considering the fact that students spend so many hours in consultation of textbooks, and considering the fact that the textbook industry is a rapidly growing half-billion dollar per year industry, surprisingly little experimental research has been done in this area. Certainly there have been the studies devoted to content analysis, readability, and typography, but no effective research is known in regard to value of textbooks or alternatives to textbooks. Perhaps this can best be summarized by quoting Mr. Kenneth W. Lund at a recent meeting of the American Textbook Publishers Institute, as reported in the previously mentioned Publishers' Weekly article:

> This was the first year of our research activities. Our concern was with the lack of information available about the materials--of-instruction industry, the lack of definitions and precision, the varied patterns of purchasing--things that the industry ought to know about itself, and doesn't.

If there is this need for research on the commercial front, isn't the need just as real on the academic front?

Libraries

More books are being used by more students in our college and university libraries than ever before, claims one annual report after another: "phenomenal rise in library use," "circulation continues to increase at a rate above and beyond that of enrollment," and " . . . circulate more books per student than for any previous year." Such statements make for good reading in annual reports (that are seldom read), but what do they tell us of the use of libraries for instructional purposes? Very little, except that in one library more books were circulated relative to some other period of time. Without better definitions, we cannot be sure that circulation statistics even tell us that more books were used at one college than at another college that reports a smaller circulation figure. And certainly such statements cannot be supported by the available research, with the possible exception of Mersand's questionnaire (1961) to college librarians. The response to the questionnaire was such that little credence can be given to the results.

Rutherford Rogers (1954) listed a bill of particulars against the use of both circulation and reference statistics as a measure of library use. In so doing, he admits that such statistics may have use in internal management situations--"invariably to ensure a certain level of financial support or to increase such support. He concludes, however, that other methods might be more effective:

> Back in 1876 Samuel Green of the Worcester Free Public Library understood some of the elementary truths of library service which too many of us have forgotten: "The more freely a librarian mingles with readers, and the greater the amount of assistance he renders them the more intense does the conviction of citizens, also, become, that the library is a useful institution, and the more willing do they grow to grant money in larger and larger sums to be used in buying books and employing additional assistants."

If gross circulation statistics can be passed over so easily, and there seems to be substantive reason why they cannot, then we must turn to other types of studies to determine if college students use library materials for instructional purposes. Studies of library use, studies of citations used in research, studies of the clientele of individual libraries, and studies of reading are numerous. A recent Bibliography of Use Studies by Davis and Bailey (1964) published by Drexel Institute of Technology lists 438 use studies in "four principal categories: (1) citation analysis, which compiles citation counts to determine the use of literature in a particular field; (2) questionnaire, sent to individuals, requesting specific information as to their use of literature; (3) interview, a personal query of individuals to determine their use patterns; and (4) circulation or diary study, which measures the use of materials through records kept either by a librarian or the individual himself." The bibliography, as extensive as it is, is by no means comprehensive.

Several investigations made during the past thirty years enable us to draw some generalizations regarding the use, or rather the lack of use, made of the college library by students. Asheim (1959), in reviewing this research, points out that "the general patterns of college library use are now well known. More studies which ask only 'how many books' and 'how many readers' are not likely to uncover any very startling deviations." His bibliography, being more selective and focused more on undergraduates than the Drexel bibliography, lists twenty-eight studies. To focus even more, three major studies can be used--Branscombe (1940), McDiarmid (1935), and Knapp (1959)--to draw a composite picture of the library user.

It is apparent from the research and from talking to students that many of them manage to spend four years at a college with very little or no use of the library. Perhaps 15 per cent of the students will not use a library book during the year and one-third will use less than one book each month. An even larger number, from one-third to one-half, will not use the general collections, but will rely almost exclusively upon reserve books and collateral reading. Librarians are continuously shocked by such figures. Knapp is of the opinion " . . . that to call the library 'the heart of the college' is to speak in hyperbole. The library does not provide the heart-blood necessary for the survival of every member of the body."

But what of the library user? Who is he and what does he use? A composite picture would show that the library user will borrow 12 books a year, not including his reserve books. This figure has been substantiated by both Branscomb and Knapp and has been supported by other studies. There is enough evidence to suggest that this figure has held constant through a period of years and has shown no significant institutional variation.

If the median average were used in the studies rather than the mean, it is certain that the figure would be much lower. Knapp's figures for total course loans for one quarter showed 9.12 as the mean and 4.9 as the median. It is the small group of users who borrow many books that bring the average up to one per month. We find that one-fifth of the students account for about one-half the circulation; and one-half of the students account for nearly ninety per cent of the circulation. One may well ask if the library use by the other half, with 10 per cent of circulation, can be categorized as for instructional purposes.

The above figure of 12 for our composite does not represent his entire library use. A high proportion of all library use is for reserved books or assigned reading. Although one may question the value of this concentrated use of a few titles, it nevertheless accounts for a high percentage of all the recorded use. For the undergraduate, the composite we are drawing, it accounts for the major part of library use.

Unlike the earlier figures, Branscomb and Knapp show no relation between their figures for reserve book loans. Branscomb states that " . . . this undergraduate, on the average, seems to make from 50 to 60 withdrawals per year from the reserve book collection." Knapp, on the other hand, shows that reserve loans "amounted to 16.83, far below the Branscomb average, far below, in fact, the figure for any of the studies he summarized." Knapp contends that this difference is too great to be explained away in terms of institutional variations. Lansberg's study (1950) of the college reserve room shows a substantial variation in this type of circulation. Although this latter report is not as statistically valid as is Knapp's, the variations are significant: for six colleges in New England with enrollments of 1040 to 1213 students, the record reserve room circulation figures ranged from a low of 6,120 to a high of 107,739, with a median of approximately 27,000. In the same study six institutions with an enrollment of 3,000 to 3,790 showed a reserve circulation range from 8,000 to 6,513, with an approximate median of 31,400. These figures would indicate a great variation between institutions or a poor understanding of the definitions used.

Knapp's figures for reserve loans for one quarter show that one-third of the students borrowed no books from the reserve room; slightly more than one-third borrowed from one to five books; 85 per cent of the students borrowed ten or less items. The composite figure for reserve loans would be about 20 books per year.

In all of the studies, there is little doubt that the average undergraduate uses the library for course-related materials. There seems to be some correlation between borrowing and sex, scholastic achievement, and academic class. The most significant differences seem to relate to the instructors and their requirements.

Asheim's summary of the undergraduate use is still good.

> In other words the over-all pattern is very much the same in all of the studies: a considerable proportion of the student body borrows no books at all; a small proportion are responsible for a great part of the total circulation; assigned reading and course-related reading account for the major part of the circulation; men borrow more generalized readings, while women borrow more of the reserve-assignment readings. Within these patterns, however, the average number of books borrowed varies greatly from school to school and from course to course. Thus it seems quite clear that the amount of reading can be increased where the course is so designed as to motivate more reading and in those schools where the tradition of wide reading is established.

His last sentence, however, does not seem to be supported entirely by research.

Knapp has shown a direct relation between specific courses and library use at Knox College. The Purdue (1964) study substantiates this not by specific courses but by broad fields of study: more than half of the behavioral scientists are frequent users of the library, while less than one-fifth of the engineers can be so classified. Knapp's study of Montieth College (1964) at Wayne State University to explore "methods of developing a more vital relationship between the library and college teaching" is more exploratory than final at this time. Asheim's statement regarding "the tradition of wide reading" seems to be based more upon hope than research.

Certainly the total loans--12 from the general collections and 20 from the reserve room, with median averages being even less--do not indicate that the library is the second home of the students. This research, coupled with Walker's study (1963) which showed that "where academic achievement is the grade-point average for two semesters of the freshman year, no evidence was found that . . . (school and/or public) library service available to high school students had contributed to their later college achievements," tends to show that library service as it exists today is not essential to academic objectives or achievement. Knapp's conclusion for Knox College seems to be supported: " . . . the library . . . played a major part in the college experience of only a selected minority of the students."

But what of the other large group of users, graduate students, faculty, and researcher work. Do they use library materials for "instructional purposes"? By the definitions used, the answer must be yes.

There have been no comprehensive studies of the use of research collections by graduate students and faculty, but we have studies by Fussler (1949), McAnally (1951), Stevens (1951), and others that are suggestive of materials that were used in the dissertations for selected fields. Also, there have been several studies of the use of periodical and serial literature. Charles Harvey Brown (1956) culminated a lifetime of study with his monograph. Other studies have been undertaken by Melvill (1957) for psychology, Barrett (1957) for chemistry and chemical engineering, Broadus (1952) in sociology, and Henkle (1957) for biochemistry. The list is long, many of the citations in the previously mentioned Drexel bibliography are in this category.

Stevens (1953) summarized the major studies on the use of libraries by research workers and reached the following general conclusions:

1. Title dispersion is greater for literatures of technologies than it is for those of pure sciences.

2. Title dispersion is greater for literatures of new sciences than it is for those of old sciences.

3. Title dispersion for literatures of social sciences and humanities is greater than it is for those of natural sciences and technologies.

4. Subject dispersion follows the same principles as does title dispersion.

5. Time span is far greater for the literature of historical studies than it is for the literature of sciences and technology.

6. Language distribution is significant for all research which is not limited to local topics.

7. The literatures of science and technology consist almost wholly of serial references, but the literature used in historical studies includes a variety of forms of publication.

8. Although some significant differences exist between the characteristics of literatures of the sciences and those of the technologies, these literatures may be considered in general as a single group. Treated in this way they exhibit a high concentration of papers in a select nucleus of special journals, and also in a brief span of time covering a few current years. In contrast, literatures of the social sciences and humanities exhibit a great dispersion of publications in different forms, on different subjects, and of a comparatively long span of time. However, this general observation is based for the most part only on evidence concerning the literature of United States history.

These studies do not tell us much about use for instructional purposes, but they do indicate a wider dispersion of use than was found with the concentrated use by undergraduates.

Perhaps the most sophisticated study of library use is that by Fussler and Simon (1961). In an attempt to define methods for predicting use of larger groups of books, they found that past use was the best predictor of future use. For example, 25 per cent of the economics collection at Chicago could be stored, assuming long term past use records, with a loss of only one per cent of the recorded use. Other items of interest in terms of instructional use of libraries were also discovered in the study. (1) There may be three to nine times as much browsing, or non-recorded, use as there is recorded use. The browsing use is proportional to recorded use between individual items. (2) There seems to be a similarity of reading interests among scholars at different institutions. Where common titles were held, and assuming other variables constant, the recorded use would be comparable. For future studies, this information could prove valuable.

Even with this research it is impossible to draw a composite picture of the use of the library by graduate students, faculty, and researcher. We make certain assumptions, and base major decisions on these. We assume, for instance, that the research workers (including graduate students and faculty) use a larger number of titles, as opposed to the undergraduate use of a large number of copies; we assume that the researcher, with his sophisticated knowledge of bibliographic aids, will use the author approach to materials, as opposed to the undergraduate subject approach. And we make further assumptions regarding the type of researcher: we assume that the physical scientist needs the current issues of a relatively small number of periodical titles; we assume that the biological scientist needs complete runs of a large number of serial titles; (and maybe we assume that we should just forget about the biophysical scientist); we assume that the behavioral scientist needs 20th century monographs, some serials, and a number of special collections of documents, pamphlets, and other ephemera; and finally we assume that the humanist might need anything and everything, and we will never be able to meet his needs to his satisfaction. These assumptions, based upon observation and hunch, are the closest we can come to drawing a composite picture of the research use of our libraries.

With such a plethora of information it would seem relatively easy to organize our libraries for more effective student use. Such is the case in terms of the statistical average, especially for undergraduates, but as Dunlap (1952) points out, "the working habits of undergraduate and graduate students are practically terra incognita to the librarians of academic institutions; exciting accounts of the literary discoveries made by research workers have been published, but these give little assistance to the librarian who desires to understand how scholars use catalogs and other bibliographic aids." And can we really understand the instructional use of libraries if we do not understand the working habits of our users?

Audio-visual

If we can say that a student cannot get through college without reading a book, be it a textbook or a library book, then it is equally true that a student can hardly get through college without using audio-visual materials. Perhaps he will not use them as a tool for his own personal use, but he will certainly be exposed to them in classroom use. And in our larger universities, it is becoming almost impossible to spend four years on the campus without having at least one course taught over television.

There are others who contend that the film is more useful for learning than the book and will serve a more important purpose. Sol Cornberg, who is perhaps one of the most radical prophets in terms of new library technology, has said that "reading and writing will become obsolete skills." As reported in Bricks and Mortarboards of the Educational Facilities Laboratory (1964), Mr. Cornberg goes even further: "The day when reading will be a primary form of information intake is also passing," he believes. Students will learn faster and better through audiovisual techniques, with films, lectures, and other materials piped directly to them in their homes . . . Today's student learns more easily from a television screen than from a book, he insists; Mr. Cornberg's advice to campus planners is explicit: "My advice is to plan no more buildings for library use. Library space is a concession to the past."

Obviously Mr. Cornberg's advice is not being accepted by the campus planners. More libraries, in the traditional sense, are now being constructed than at any other time in the history of higher education. But Cornberg's concept of electronic learning carrels is now being accepted more and more on college campuses. Many of the new colleges, such as Grand Valley in Michigan, and many of the older colleges, such as the University of Michigan, are planning a large number of these carrels to provide the newer media of information to the college students.

No surveys can be found that indicated how much the audiovisual materials are being used by our college students, nor is there an easy way to arrive at even a guess as to the amount of the use of visual materials on the college campus. There has been millions of dollars' worth of research on the potential of audiovisual materials, but there seems to be no research on their actual use.

Purdue University (1965) has a unique program or providing students with tapes, films, film-strips, records, and audio-visual devices for their individual use, or for group use if the students so desire. Last year 65,000 such items were borrowed by the students: 80 per cent tapes, 14 per cent motion picture films, and 6 per cent other. Granted that a major portion of the use is for tapes, including foreign language tapes, the number of loans is significant. Perhaps other libraries would show similar non-book use if they provided the necessary facilities.

In the Handbook of Research on Teaching, Lumsdaine devotes 100 pages to a chapter entitled "Instruments in Media of Instruction," the major portion of which is concerned with research on the use of audiovisual materials. Certainly they can be used effectively, on almost any level of instruction.

As compared with the previous section on library use, we can draw an interesting generalization: We know more about the effect and the effective use of audiovisual materials than we know about print, but we know more about the extent of the use of print by the college students than we do about the extent of audiovisual use. The implications for future research are obvious.

Implications For Research

This survey of the research on the use of materials by the college student does not take us much further than we were in the first paragraph: we know far too little about what students use. We have some assumptions based upon observations; the available research is notable mostly for its superficiality and incompleteness, and in broad areas we know nothing.

Before projecting the type of research that is necessary, a word should be said regarding who is doing the research on library use and even on other library problems. In most cases it is the practitioner or the library user himself. In the more established professions--medicine, law and education--basic research is undertaken in the professional schools of the universities. Such does not seem to be the case in librarianship.

It is obvious that if a research program is to be developed to work on the many problems facing the librarian today, it must be done through the established library schools. Many research proposals in the past few years have been funded by the governments and foundations, but all too often the principal investigator has been the practicing librarian (who although qualified by training and experience, cannot devote the necessary time to research) or the user, either a user from an allied discipline or a user from one of the research firms. Nothing can or should be taken away from the work that has been done by these individuals, but for a long range program, the library schools will have to be developed so that they can make better use of their research potential.

The American library schools today are teaching more students than ever before; most of the schools are understaffed and recruiting for new teachers may even be more difficult than recruiting for new librarians; and space for new faculty, even for teaching, is at a premium. These problems must be met, however, so that the research arm of the library schools can be developed. The funds that are now going to private firms might well be channeled through the schools if the capabilities for doing the research were there. The development of research institutes within the library schools would seem to have a high priority if we are to find out more about the use of materials.

Three recent studies are worthy of special mention because of their implications for future research: Knapp's studies of the users at Knox College and

Montieth College and Fussler's study of materials at Chicago. These three studies alone suggest that there is much research left to be done.

Knapp's case study of Knox College relied upon an analysis of circulation records and interviews with the faculty regarding the use of the library in the educational program of the College. The circulation analysis, which has been reported in some detail above, followed the pattern of earlier investigations. One point isolated was that certain courses account for a high percentage of library use; one-fourth of the courses accounted for almost ninety per cent of the use. Perhaps more important than the useful statistical data was the "implication . . . that there is widespread lack of understanding or, at least, consensus among faculty and staff about what a library can and should contribute to the college. . . ."

The Montieth College project at Wayne State University gave Knapp and her associates an opportunity to explore the methods of developing this vital relationship between the library and college teaching. They were particularly concerned that traditional programs do not develop a sophisticated understanding of the library that is necessary with the increasing emphasis on independent study.

The major hypotheses follow, one on another, and say in essence that 'if librarians participate with faculty in course planning, they can get student use built into the courses planned. . . ." The social structure of Montieth College, as analyzed by the anthropologist member of the Project staff, will not differ greatly from other colleges. The librarians were not easily accepted as full and equal members of the teaching departments. In the final stages of the project, members of the teaching staffs were selected to serve the Library Project as representatives of their departments. Such an arrangement seemed to permit fuller utilization and acceptance of library assignments.

The second part of the hypothesis was that " . . . if student library use is built into courses, students will use the library for these courses, and if students use the library for their courses, they will acquire understanding of the library and competence in its use." The study does not present significant statistical data on the increase in sophistication of library use, but it does point to a method of increasing our knowledge in this area: studies in depth of a small number of cases.

The major result of the studies on library experiences was the development of a model program for future use. The program consists of a series of ten assignments that are related to the curriculum and "are designed to give students experiences with the total library system, particularly with the scholarly-reporting part of it, such that they can discover empirically certain general principles about the way the system is organized and about the choices and decisions one must make in order to use it effectively."

The Montieth Project is as yet in the exploratory stages, but certainly a look at the library user in direct relation to his course work will prove more useful than further data on how many books are checked out by how many students.

Fussler's study of materials, rather than a study of the user, is one of the best investigations in the field. The purpose was to find if "any kind of statistical procedure (would) predict, with reasonable accuracy, the frequencies with which groups of books with defined characteristics, are likely to be used in a research library." The sampling techniques and the statistical analyses are much more sophisticated than previous studies on the use of materials. Although the author refers to the investigation as "exploratory," it will certainly serve as a model for further studies--much in the same way Fussler's earlier research use study served as a guide for extensive studies of the use of materials in specified fields. The profession will profit if his recent study will serve in a like capacity.

If Knapp's work will serve as a prototype for further work on the relation of library use to specific courses, and if Fussler's work on materials is continued, what other research is needed and how can it best be accomplished?

We know nothing regarding the communication behavior of the college student. Although we have had extensive research on the communication habits of the entire population, and portions of the population, by age groups, profession, and education, no one has asked the college student what materials he uses and why. Such a study would prove most interesting, not only for the librarian, but particularly for the educator and the producer of instructional and other materials.

The procedures and techniques that have been developed over the past several years for communications research would be appropriate for a study of the college student--the mass media, textbooks, library materials, and the audio-visual aids.

A companion study of what the college instructor demands, or what he thinks the student is using, would be helpful. This study would also give us information as to the materials used by the instructor for his course work with the student. The implications of the companion studies--what is used and what is supposed to be used--are obvious.

Dunlap (1952) decried the lack of research on and the lack of interest in the library user:

> Libraries exist to serve the readers of today and tomorrow. This is axiomatic, yet librarians know little about these readers and their probable demands. Even more surprising is the fact that college and university librarians manifest comparatively little interest in services to readers: a recent survey of areas which college librarians consider worthy of investigation reflects an active interest in administrative problems and in non-book materials but comparatively little concern for the use of the collections.

Perhaps the administrative problems would seem less important if we knew more about who uses what materials for what purposes.

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GENERAL BOOKS, TEXTBOOKS, ENCYCLOPEDIAS AND BIBLIOGRAPHIES

by

Leon Carnovsky

The central question raised by the Conference -- the use of materials for instructional purposes -- carries with it the concept of motivation: Why people read. To what extent is reading the result of, or motivated by, instructional needs? In a formal situation, such as a school or college, the answer is suggested by certain obvious measures: books placed on reserve for classes, and the extent to which they are used. Both are tangible and quantitative; it is arduous, but possible to compile reserve lists, and it would be possible even to maintain records of loans. But such records, however accurately accumulated, must inevitably suffer from certain limitations. We cannot assume that reserve books are borrowed, that borrowed books are read, that books read contribute to the instructional goal, though this would seem logical. Worse than this, we do not know much about non-reserve reading; even if loans from the general collection were counted, it would be difficult, without special arrangements, to know who borrowed what books for what purpose. And we are completely in the dark concerning non-library reading: the use of textbooks, book purchases, loans from other libraries or from non-library sources. In the past, attempts have been made to get at such information from the readers themselves. These have taken the form of recall (asking the respondent, by interview or questionnaire, to recollect book and periodical reading over a one- or two-week period); or diaries, in which the respondents record, more or less faithfully, their daily reading over a prescribed time period, together with an indication of the sources from which the reading matter came. Altogether aside from the nuisance involved in such methods, the necessity of enlisting sympathetic subjects, and the dangers of incomplete or faulty recording, the investigator must cope with the sampling problem: how many subjects are necessary to provide reliable results? And he must also determine over how long a period records must be kept, or recall invoked, to satisfy reliability. Furthermore, if recall beyond, say, two weeks is requested, can the results be valid, especially if the subject is a heavy reader?

Even if all sampling problems were satisfactorily solved, generalizations are possible only as long as the basic conditions remained the same. A generalization may be applicable to a particular situation or community without being extended to other places. In short, a reading pattern, however defined, may be established for one community, but this does not mean that it can be applied elsewhere (or even in the same community at another time if in the interim basic conditions have changed). In fact, the chances are that it cannot, especially if the sophistication of the readers, the availability of reading sources, the methods of teaching, etc., in other communities or at other times are substantially different.

For any review of studies in library use Berelson's Library's Public must inevitably be the point of departure. It summarized every important study made up to about 1950, and interpreted the results to show what libraries were used for, and by whom. Yet it should be noted that Berelson was primarily, if not exclusively, interested in the public library; studies of academic and school library use were beyond his scope. Interestingly enough, however, Berelson's report came after a period of considerable activity in reading-use study, and the fifteen years since have seen nothing like the emphasis. This is almost paradoxical, for these last fifteen years have witnessed the expansion of graduate study in librarianship, with half a dozen schools awarding Ph.D.'s, and the interest in research manifested by the Council on Library Resources and the Department of Education. Whatever research has been carried on in library affairs has shifted to other than reading. As Ennis and Fryden noted: "During the early 1930's and continuing intermittently for more than a decade, studies identifying the patrons of the library and what they read were plentiful. With only a few exceptions, library research interests have turned elsewhere." (Library Quarterly, 1960.)

I.

From its beginnings the American public library was justified by its educational potentialities, whether seen in a cultural, informational, or instrumental sense. The concept of books for instruction, clearly visualized in the Puritan respect for books and learning, was central in the early social libraries and was inherited by the public library. It is unnecessary to emphasize its applicability to the school and academic library as well. That reading for recreational purposes loomed so large in all public library activity cannot obscure the fact that education-motivated reading is still a central article of library faith; more, that such reading, though not readily amenable to quantitative demonstration or statistical proof, still constitutes a significant contribution by most if not all libraries.

This instructional role has come in for renewed and increased attention as a result of changes in the size and particularly in the geographical distribution of the population. Whereas 100 years ago only 16 per cent lived in cities of 8,000 and over, today it is estimated that 70 per cent live in urban territory. This has come about not only through natural increase in population, but, more significantly, in the shift to the city from the rural areas. As the rural areas have lost in numbers, it has become more difficult for them to support local libraries though the need for books for those still in small towns or on farms presumably still prevails. Since the local library (if any) cannot possibly supply books in the variety needed, the potential reader must look elsewhere, and the state library would appear to occupy a strategic position.

The function of the state library to supply such material is not new, but in view of the change in urban/rural population distribution it has become enlarged. This is at least theoretically the case; it would be of interest and value to know to what extent it is actually so. Has there been an increase in demand for state library and extension services? If so, what form has it taken: for more itinerant (bookmobile) services, for the establishment of branches throughout the state, for assistance in setting up local libraries? Do requests for books come from the non-library areas or from communities already equipped with serviceable libraries? What kinds of books are wanted: popular books, best-sellers, etc., or books in infrequent demand? Do the requests come from students, teachers, the general public -- and how do the population groups vary in their demands? Answers to such questions would throw considerable light on the nature and character of the state library's performance, and they would also clarify the relation between locality and state in the provision of instructional materials.

The most comprehensive study of state library use was made in 1941 by John Van Male. He wrote to some 400 persons in 8 communities in Wisconsin who had borrowed books from the state library agencies, asking why they had requested books, what other sources they used, and their opinion of the system. His generalized findings are not unusual or unexpected, but in view of the many changes that have taken place in the 25 years since his study, it might well be repeated -- not only in Wisconsin but in other states as well. It would be desirable also to extend the coverage beyond 8 communities to embrace the state at large, and to inquire much more intensively into specific titles as well as types of books in demand; and to ascertain whether the books requested were not locally available in public or school libraries. We need very much to know more about the scope and effectiveness of non-local library service.

Along with the potentially increased dependence upon the state library we should also note the trend toward dependence upon regional depositories to supplement local collections. The depositories sometimes take the form of state library branches, and sometimes existing university or public library collections are designated as regional sources. The Illinois state plan calls for such an arrangement, with the Southern Illinois University Library named as the source for the southern tier of counties in that state. It is important to know whether this library, or others of the same general type, can effectively serve as proposed: Will they have the kind of books needed, can they make available such books in the face of demands from their own students and faculty; what kinds of books do they find it difficult or impossible to provide; and since the heaviest demand is likely to come from high school students and their teachers, how effective can a university library be in taking care of them? If the answer is qualified or negative, it may suggest that an entirely different scheme of organization is called for -- perhaps the establishment of a new regional library keyed specifically to the needs of the rural residents for whom it is responsible.

A third series of questions emerge from the dependence on the bookmobile. For a long time the bookmobile has been suspect as a substitute for a stable library; experience in many places indicates that at best it serves as a source for children, and adults stay away. Is this because of the kinds of books provided, or because the bookmobile itself, with its cramped quarters, repels the adult? The bookmobile undoubtedly has its function in book distribution, but we need to know how effectively it performs in areas where no other outlets exist.

In summary, it is suggested that the solutions long advocated for reaching the population in small towns and rural areas -- by invoking state library, regional resources, or bookmobile -- be looked at critically, to assess their successes and failures; and to open the way to seeking perhaps more radical means of bringing materials to those who need them.

II.

The dramatic change in the pattern of school attendance, especially since the war, is too obvious to require documentation. No one can remain unaware of the overcrowding of elementary and secondary schools; of the proliferation of colleges; of the longer periods spent in educational institutions at the higher levels, reflected in still larger enrollments. Every major public library can testify to the impact this increased enrollment has made -- in the demands for books, for information, even for seating space. And, of course, a similar impact is evident in the school and college libraries directly responsible for student instruction. It is no exaggeration to say that this problem is more acute than any other facing libraries today: How to accommodate the increased demand for school- or academically related services, at the same time maintaining its services to children, to the adolescent no longer in school, and to the adult masses.

The easy, but largely impractical, answer is more books, more buildings, more space -- all contingent upon more money. Money will surely be forthcoming from the government, but it is doubtful if it can ever be enough to solve all library problems. Altogether aside from this, however, there are certain questions that should be examined. To what extent, for example, do school libraries and public libraries in the same geographical area or neighborhood duplicate each other's holdings, and in what respects and in what kinds of materials are they unique? This is not to imply that duplication is necessarily bad or uneconomical. In a larger sense such a study may lead to the conclusion that while, for example, school libraries hold reference tools, periodical files, and curriculum-related books, they may be moved to changes in administration or regulations -- longer hours, availability on week-ends, greater seating capacity, and the like -- thus relieving the burden on the public library without doing violence to educational outcomes. Clearly, the book rather than the institution is basic.

In addition to considering the school library in relation to the public library, one may look at it historically, raising the question as to how it has responded to the enlarged demands imposed by curricular developments. Have collections grown commensurate with enrollment, have they changed as curriculum and teaching methods have changed? What has been the experience in different parts of the country, in different types of school? Such questions have more than antiquarian, even historical, interest, for they emphasize the fact that a library which may have been adequate two or three decades ago may be considerably less so today. If nothing else, they bring into sharp focus consideration of what makes a good library -- "good" in the sense of educationally relevant to the overall program of the school itself.

Fifteen years ago Berelson wrote: "There are no data indicating the proportion of the library's circulation to children and youth which is school-related and the proportion which is free reading. To what extent does the public library supply curricular material to students who are not adequately provided with such material in their schools? How does this differ at different age and grade levels? Do students who come to the library for curricular materials stay to use non-curricular books? The answers to such questions are not now available." Today the answers are still not available.

Turning from a consideration of library contents, we may next consider how school and public libraries are used, particularly where both are in the same neighborhood. Does use of one take the place of use of the other? Or does the use of the school library stimulate use of the public library? One might speculate on logical grounds and even point to presumed evidence, but carefully controlled studies centering on the readers rather than on circulation statistics should be encouraged. Such studies might go beyond the library sources and reveal the significance of borrowing from friends, home collections, gifts and bookstores as instrumental in providing the literature read by students. The time is ripe for new investigations, with particular reference to students, on the theme: Who (what kind of student?) read what (types of books, periodicals, etc.) and where do they get it? The educational or psychological aspect, suggested in the phrase "with what effect?" constitutes the most significant, and most difficult, kind of study, yet it has not been ignored; the attitude studies of an earlier period offer suggestive approaches.

III.

Along with the increase in school and college enrollments, the nation has experienced an enormous increase in graduate study: new subject areas continually being explored, along with new facets of traditional disciplines, and students in all areas far beyond the numbers less than a hundred years ago. In 1869-70 less than 10,000 college degrees of all kinds were conferred; in 1961-62, there were more than half a million. Not a single A.M. was recorded in the earlier year; a century later the total was nearly 30,000; the single Ph.D. conferred in 1870 contrasts with the 11,400 in 1962. We need not dwell on the library implications of these increases; the financial, bibliographical, and personnel problems they raise have been amply ventilated by the profession, and the current response of the federal government reflects an awareness of them.

The use of library materials in graduate study has been measured in various ways: early, in the several citation analysis investigations; later, in the Fussler and Simon study "Patterns in the Use of Books in Large Research Libraries"; and currently in retrieval studies concentrating on electronic applications, especially in the sciences. Yet one may anticipate a series of investigations aimed at ascertaining how the several disciplines vary in their dependence on sources of different kinds. Have the earlier investigations exhausted this area of study, or is current scholarly research dependent on different types of source materials? Fussler found that of the citations in research in chemistry in 1946, only 5.63 per cent were to monographs and 92.10 per cent to serials; in physics, the comparable figures were 7 per cent to monographs and 92.20 per cent to serials. In the use of botanical literature Hintz found that in the United States, Great Britain, France and Germany the proportion of references to serials steadily increased between 1899 and 1939; in 1939, in the United States it was 86 per cent. Not surprisingly, quite a different pattern was revealed in the citation analysis of studies in American history. Here, in a study by McAnally in 1952, books led with nearly 44 per cent of the citations, and periodical articles represented less than 10 per cent. These investigations were conducted more than a dozen years ago; whether different results would emerge today, and whether different methods would yield different results, are questions that cannot be answered without study. Such studies would be worth undertaking to provide insights into the use of materials by advanced students and, no less important, they might conceivably contribute to the solution of problems of storage, arrangement, and availability of research library holdings.

IV.

The current state of book distribution in America has been so thoroughly reported by Lacy (The Public Library and the City, ed. by R.C. Conant, 1965) that it will suffice to mention a few of the high points as a basis for suggesting areas in which investigations might be undertaken. Thus:

(1) Probably no more than 1,500 bookshops, department stores, and similar outlets undertake to carry a respectable book stock. Most of them are found in "cities of 50,000 or more or in college towns."

(2) Approximately three-fourths of all bookstore sales of hardcover books are concentrated in the 25 largest metropolitan areas; the residents of small towns and rural areas have little opportunity even to know much about new publications, much less to see and buy them. Lacy estimates that sales in the 25 largest metropolitan areas amount to less than one-half book per capita per year; for the rest of the country, about one-fifteenth per capita.

(3) Even the introduction of the paperback, with its widespread availability, has failed to make us a book-reading population; Gallup estimates that 85 per cent of all such sales go to only 11 per cent of the population. Allowing for errors of sampling and interpretation would not increase the figures appreciably; according to Lacy, the maximum is not likely to exceed 20 per cent.

(4) Since the needs of the culturally deprived cannot be met through the conventional commercial book-distributing channels, "the library should be the social instrumentality" to translate such needs into a demand. Otherwise they will not be met.

(5) Libraries must be the means through which books are brought to those who do not now use them.

There is much more, both in Lacy's portrayal of the situation and in his interpretation; but the above points may be taken as a springboard for the consideration of problems worth investigating.

(1) To what extent are significant books (not best-sellers) available in public and college libraries? Numerous studies, based on checklist techniques, may be identified; the more significant ones which had been conducted before 1950 were brought together in the Public Library Inquiry, and the Inquiry itself carried on studies to show the relation between bibliographical strength and financial status. We should have more such studies, primarily in cities with many libraries, and in regions, such as metropolitan areas, counties, or groups of counties. As an illustration, we may raise the question, How many and which of the titles listed in, say, Hawkins' Scientific, Medical, and Technical Books are available in libraries in Milwaukee, or in any given county? Such a survey would not be limited to a single library, but would cover local special and academic libraries as well as the public library; and would throw considerable light on the reader's access to significant materials. Similar studies might be launched in any of numerous subject fields. Once the facts are known implications for development of collections may be seen and appropriately dealt with.

There is also the possibility of studies of duplication and lacunae in libraries closely adjacent to each other. Suppose, for example, that certain counties were selected, some with many independent libraries, others with a county library plus independent municipal libraries, others with public libraries varying widely in size. For each we might ask:

(a) What is the extent of duplication in holdings?
(b) How many titles are unique -- i.e., held by one library only?
(c) Of recent significant titles, which are not held at all?

(2) What has been the effect of the paperback on library acquisition and use? Libraries have responded variously to the paperback; some have welcomed it as a means of solving the problem of multiple requests for the same title; others have regarded it as a means of relieving them of the responsibility for providing popular reading matter which was conveniently and economically available through commercial channels. Somewhere between these extremes is the practice of providing texts and school-related titles required by students. Though there have been numerous articles by librarians describing what they have done about paperbacks, there should be a comprehensive study not so much aimed at how many libraries do certain things but at relating policy to subsequent use. Not only how widely paperbounds are used, but the extent to which books with potentially educational or instructional content are borrowed by students and adults. Studies aimed at such information may be conducted on a sampling basis -- in fact, they may be part of the larger investigation of who reads what, referred to earlier.

(3) How effective have regional networks been in supplying books in relatively little demand? In some ways this is among the most important questions concerning libraries today, for it cuts to the heart of library structure. To put it briefly,

librarians have long known that the conventional pattern of localism in library organization and operation has, except in the large jurisdictions, militated against the provision of many books in the ordinary trade, to say nothing of university press publications, books in foreign languages, monographs, and specialized works. All this was spelled out in the Public Library Inquiry, and the A.L.A. Standards of 1956 were designed in large measure to correct this situation. Perhaps the outstanding example of progress is provided by New York, where the state has acted forcefully to permit the organization of library systems, and where considerable emphasis has been placed on the development of collections far in excess, both in size and variety, of what libraries working in isolation could achieve themselves. Now the question: What difference has it made? It is of course easy to answer this in terms of money, book and salary expenditures, and bringing books to communities formerly without them. But beyond this it is important to know if the character of use has changed as a result of the system. How much is the larger book supply depended on for wider reading than may be provided by the local library? This question is similar to one raised earlier in connection with the state library, the difference being that the regional center instead of the state library is the focus of attention.

(4) Among the efforts made to strengthen the quality of library collections, the experience of North Carolina is especially worth noting, because of its economy, logic, and potential contribution to effective access to books and periodicals in relatively little demand. In 1950 the Library Commission presented a plan to the largest public libraries of the state whereby each would adopt a subject area within which to develop an unusually strong collection. The subject areas would reflect those in which the library was already fairly well supplied and would represent industrial or other interests in its immediate community. Books in this collection would be available not only to the immediate residents served by the library but to anyone in the state, the Library Commission acting as medium for clearing the interlibrary loan requests. Originally, eight libraries were assigned special subject areas for intensive cultivation, and each was given $750 out of the State Aid Fund to develop its specialty. The original subject areas assigned were Art, The Negro, Gardening and Landscape Gardening, Textiles, Citizenship and Government, Architecture, Family Life and the Home, and Business and Insurance; subsequently other areas were assigned, and there are now at least fifteen. In June 1951 the Commission began publication of bibliographies based on such special collections, with supplements to be issued periodically. Thus, the student or adult anywhere in the state who is interested, say, in reading about Insurance may readily learn about the extensive collection developed in Greensboro, and he may obtain books far beyond those available in his local library.

This scheme is imaginative and sensible; how well has it functioned? To what extent is advantage taken of the stronger collections? Is there a latent demand which has been met in North Carolina? It should not be difficult to get answers to such questions, and they would illuminate not only the areas in which people are seeking more information, but also the degree of success to which the North Carolina practice has contributed. If the program has proved successful it may well serve as a model for many other states, since it involves a relatively small outlay of funds. In fact, even without external financing, a group of libraries in adjacent communities and crossing state lines may voluntarily engage in programs of specialization and interdependence.

This presentation of materials for instructional purposes has gone beyong consideration of books in formal education, but informal education and reading for instrumental purposes are also important. Indeed, if adult education is to be interpreted as intellectual growth, the contribution of the public library cannot be ignored.

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REFERENCE BOOKS

by

J. Harlan Shores

Definition and Scope

In order to delimit the scope of the several papers being presented at this Conference, the phrase "Reference Books" is used to include "Handbooks, Directories, Manuals, Indexing and Abstracting Sources, Yearbooks." Attention will be given to these sources. However, the literature dealing with instruction in the use of these reference books commonly includes them as a part of "Reference Skills" or more broadly as "Basic Study Skills" or as skills in "Reading in the Content Fields." Perhaps under these conditions the author of this paper may be pardoned for slipping into a broader context of "Reference Skills" and thereby into the peripheral scope of other papers.

Analytical studies of reference books, such as those done to compare sources or to review them, will not be included in this paper. The paper instead will concentrate on the instructional use of these materials.

The next portion of this paper will present a brief survey of the published research literature relating to the instructional use of reference books. The brevity of this section is due to the dearth of research in this field and not to any attempt to minimize the importance of the studies reported.

A third and final portion of this paper will consider "Projected Research"--a description of the kinds of status and developmental studies for which this author sees a need.

Survey of Literature

The literature concerned with the instructional use of reference books offers an imposing argument for such instruction, a variety of opinions concerning what should be taught and even about which parts to emphasize. There is no lack of admonitions to "do this" and "don't do that" in both classroom and library. But when it comes to empirical evidence, the cupboard is almost bare.

It isn't the purpose of this paper to report or even to summarize the literature about what to teach and how to teach it, as this relates to the use of references, but it may help the unwary to have a map in case he wants to survey these opinions. An excellent overview of the scope of this endeavor is offered by George D. Spache in Reading in the Elementary School.[1] Among the reading authorities, Dr. Spache is among the most knowledgeable in the area of "basic study skills" and Chapter IX, "The Combined Program for Intermediate Grades," provides a fine map of the field. In fact, the program Spache outlines for grades four, five and six needs little except extension in depth to be a good guide for instruction beyond the elementary grades.

Cheney's Study

Arnold B. Cheney reports "A City Wide Effort Improves Study Skills" in the February, 1962 issue of The Clearing House.[2] The city involved, Canton, Ohio, found its seventh-grade children below the national norm by 1.5 years in 1956, 1.8 years in 1957, and 1.4 years in 1958 on the Study Skills section of the Stanford Achievement Test (Reading Charts and Tables; Map Reading; Using the Dictionary, Sources and Index).

The improvement program in Canton could be characterized as an administrative drive. The city was divided into six districts and each district further subdivided by grade level groupings. Teachers met and discussed ways to improve study skills. The results of these discussions supplemented by other materials formed a booklet on how to teach study skills. This booklet went to each teacher. Inserts in the pupil reports about the study skills program went to parents. Articles were carried in local newspapers. One summer was spent preparing an item analysis of the Stanford test indicating areas of weakness and drawing profiles by schools. Reading workshops were held and units on how to study were developed.

This type of concentration on basic study skills resulted in a sixteen-month gain when the scores of the seventh-grade children in 1960 were compared with those of 1956. Both groups were measured on the Stanford test.

The design of this simple experiment to measure gains in scores by successive groups of seventh-grade students after city-wide attention was given to the improvement of study skills has several obvious shortcomings as it was reported. First, we don't know whether the two groups of seventh-grade students were really comparable. Communities and school populations do change over a four-year period. Second, we don't have much of a description of the experimental conditions that evidently led to the results. Many steps were taken. It would be nearly impossible to replicate this experiment. Third, or perhaps in connection with the experimental conditions, it may be that the item analysis done with the Stanford test resulted in "teaching the test." If this were an inadvertent result, the unusual gains reported would be less impressive. Fourth, the 1960 sample of seventh-grade students was only 30 per cent (500 students) of the total seventh-grade population. Unless considerable care was taken to make this sample representative, the results could be skewed in either direction. Fifth, Mr. Cheney reports that the top 2 per cent in academic achievement were a part of the 1956 sample but had been drawn off into special classes after the 1957-58 school year. Thus in this respect the two samples were obviously not comparable. Even ten very able students at the top of the scale can influence a mean of a group of 500. It is likely then that if the groups were comparable in other respects, the sixteen-month gain is an underestimate.

The Cheney study is one of a kind needed. Even though it is difficult to tell what was effective in the Canton plan, something evidently was. Further experimentation, repairing, if possible, some of the errors of design, might indicate more clearly where the magic lies. More complete reporting, including a breakdown of the Stanford test pointing out the relatively unreliable part or even item scores, might provide hints concerning the improvement of specific reference skills.

Perkins' Study

Ralph Perkins, Director of Library Education, University of North Dakota, published in 1965 a study of The Prospective Teacher's Knowledge of Library Fundamentals.[3] A total of 4,170 college seniors enrolled in student teaching were tested during the years from 1961 to 1964 using at least one of four tests of library usage. Subjects were drawn from 69 colleges in 38 states. Perkins discussed the responses of these prospective teachers to each item on three tests--an unpublished test developed by Perkins and his associates, the "Peabody Library Information Test," and "A Library Orientation Test for College Freshmen" developed by Ethel M. Feagley and others, hereafter referred to as the Feagley test.

The general burden of Perkins' findings is that prospective teachers in their last year of preparation score far from perfect scores on the various items and parts of each of the three tests of library usage. He finds a marked spread in percentage of correct answers within each part of each test and also a marked spread among the schools represented. Perkins didn't compare his population with any norms. The apparent assumption was that teachers in the latter stages of their preparation should make few, if any, errors on these tests. While we might wish that prospective teachers would knock the top from all college-level tests, including these three, such a hope is surely unrealistic.

Of more value are Perkins' observations about individual items where he offers evidence of types of errors and conjecture concerning why items were missed. In many instances he was questioning the face validity of the item. In others, he was assuming the item to be valid and was pointing to the need for instruction.

While the consideration of individual test items took the bulk of Perkins' book, he reports a few preliminary studies which deserve mention as they relate to his study and to others in which library usage tests have been applied. He reports a study by Flossie L. Perkins[4] involving 91 college seniors who were administered both the "Bennett Use of the Library Test" and the "Peabody Library Information Test." A Spearman rank-order correlation of .385 was found between these two tests. Ralph Perkins comments that "Although both tests have been standardized it would appear from this low correlation that one or both of the tests was a poor test or that one or both of the tests do not measure what it (they) purport to measure."[5]

Ralph Perkins also used rank-order correlation to relate scores on the Bennett, Peabody and Feagley tests to grade-point averages earned in college courses. Sampling included 48 students each for the Bennett and Peabody tests and only 14 for the Feagley test. The Bennett test results correlated .305 with grade-point average. For the Peabody test the correlation was .220 and for the Feagley .230. While these are small samples, they do lead one to suspect that scores on such tests and grade-point average are not highly related.

It is apparent that Ralph Perkins' study loses much of its potential power through the weakness of the instruments available to him. The Bennett test was probably ruled out for his purposes because the large percentage of true-false items in it do not readily lend themselves to the type of ability analyses Perkins was making. The Peabody and Feagley tests were the only two published ones remaining. Some of the technical weaknesses of these tests are pointed out by reviewers in the volume of the Mental Measurements Yearbook[6] where they were first reported. The low correlation between the Peabody and Bennett tests and between scores on these tests and academic standing suggest more basic difficulties. One gets the impression that these tests have not been given the thorough psychometric analysis that a published test deserves in the process of development and standardization. Perkins may be trying to cut fine lines with rough tools.

Perkins' study would be strengthened had he used his own data to provide some of the information often found in technical manuals of standardized tests. His data could provide his own reliability coefficients, statistical item analyses, and even norms of a sort for his own group. Each of the tests used is broken into fairly discrete sections (the card catalog, alphabetizing, use of reference books, use of indexes, etc.). It would be interesting and informative to teachers and librarians to know how abilities with these sections, of the same test or combined from all tests, relate to each other.

The suggestion in Perkins' data that the positive relationship between knowledge of library fundamentals and academic achievement is a low one, surely deserves closer attention. Joseph E. Moore[7] in a 1940 study reports a positive correlation of .89 plus or minus .01 between scores on the Peabody Library Information Test and educational age, based on the Unit Scales of Attainment for children in grades four through eight. On the other hand, W.D. Joyce,[8] tested 64 students of elementary education during their senior year in college with the Feagley test and found a positive correlation with college grades of only .41. While Joyce finds this a statistically significant correlation, it surely isn't of the magnitude often found between areas of achievement.

Taking a different tack, Richard Walker[9] found that the grade-point averages of college freshmen did not show significant differences between the students with a high level of library service available to them in high school and those with poor or no library service available to them in high school, when ability and aptitude were controlled.

While these studies do not add up to the same conclusion, taken as a whole they tend to cast doubt upon the contention that the library is at the heart of the instructional program, at least at the college level. Such studies beg for further research into the relationships between library use and academic achievement at various educational levels.

Shores' Index Study[10]

In the spring of 1964 and in anticipation of the publication of reference books for children, Grolier, Inc. financed a study to find whether children in grades three to six are more successful with a letter-by-letter or word-by-word scheme of indexing. The population included a total of 598 children in grades 3, 4, 5, and 6 from three schools located in upper-middle socio-economic areas.

Two tests were devised, each with the same 510 entries grouped around five basic words (air, black, long, new, and Washington). Approximately half of the students (306) responded to the test where the entries were arranged in the straight alphabetical letter-by-letter arrangement. Every other child in the normal classroom seating arrangement (292) responded to identical entries arranged in a straight alphabetical word-by-word arrangement. Each child was given the same 20 key words to locate on the two tests. The time limit of 10 minutes for each test was rigidly enforced.

A small pilot study involving a stop-watch technique and interviews indicated decided superiority of the letter-by-letter scheme. Testing the significance of differences between proportions with a one-tailed test, the hypotheses under test were:

> H_0: At least as many errors will be made with the letter-by-letter list as with the word-by-word list.
>
> H_1: Fewer errors will be made using the letter-by-letter list.

Similar hypotheses were stated for differences at each grade level.

Shores found that children at all grade levels locate words more quickly and with fewer errors when using a letter-by-letter arrangement as indicated by raw scores. Children at grades three and four do significantly better with a letter-by-letter arrangement (P=.02 at grade 3 and .04 at grade 4). Children in grades 5 and 6 found entries better in a letter-by-letter arrangement, but at these levels they do well with both schemes. At the fifth and sixth grade levels the top of the test was inadequate. The probabilities favoring the letter-by-letter arrangement were .07 at grade 5 and .17 at grade 6.

Of the 598 children tested, 258 were from an elementary school judged to have an excellent school library and an excellent full-time librarian. The remaining 340 children were from two schools adjoining each other in a different city with no school library. The three schools were judged to be similar in other respects. Comparing the scores of children from the library and non-library schools, Shores reports that children from the library school use both the letter-by-letter and the word-by-word index better at all grade levels than do children from non-library schools. However, these differences are not statistically significant ones. For all children tested in both library and non-library schools, the general superiority of the students in schools with libraries was established at the .11 level with the word-by-word index and at the .13 level with the letter-by-letter index. A larger sample would very likely have established these differences at the .05 level.

The general superiority of the letter-by-letter index, especially in grades 3 and 4, would suggest that children at these grade levels would use this type of index more efficiently and might develop efficiency with this scheme more readily.

The design of Shores' study was that of a simple status study using post-test results only. Perhaps the greatest shortcoming is that the basic question investigated is of little concern to either teachers or practicing librarians. None of the teachers of Shores' groups knew that there were these two and other schemes of arranging words in an index. They probably cared even less. There are, after all, relatively few words that begin alike and have more than a few entries under the base word. Even words such as "long," "black," and "Washington" have few entries in most of the books read by elementary children. If this study is of value to anyone, with the possible exception of publishers and professional indexers, it may be only as a prototype for more important concerns relating to children's reference behavior.

Even as a prototype, the design of this index study has shortcomings. It is likely that more meaningful results would be obtained in most tests of reference skills if rate and accuracy scores were computed separately for each child. This might be done by substituting a device such as the "Automatic Elapsed Time Indicator"[11] or the "Test Timer" of McDonald and Alodia[12] for the rigid time limits. In this manner, efficiency could be measured in part by the time taken to complete the task.

The pitfalls of comparing children from different schools and assuming equality among the many dependent variables are well known. When these schools are from different geographical regions, as they were in this comparison of library and non-library schools, the errors tend to be magnified. If these types of comparisons are to be made, the experimental conditions should be much more carefully described and controlled. For that matter, the sociological conditions in both school and community of the population(s) in Shores' study should be more carefully described if anyone is to replicate these findings.

Projected Research

In most instructional fields where there is a dearth of creative research, there are numerous descriptive status studies that provide a base in present practice for projecting developmental studies or programs. When such a base does not exist, there probably is need for both descriptive status studies and developmental research. Each of these types will be indicated by some of the kinds of questions that need to be answered and, where it seems pertinent, by suggestions of research design.

Status Research on Use of Reference Books

Definition of the Field and Advocated Practice

Even before we can find out what the schools are doing, we must define and delimit our field of inquiry. What are reference skills? How do authorities advocate that they be defined, organized, grade-placed and taught? As was mentioned earlier, literature is available for this type of investigation.

Present Practice

Having defined the field and found out what the "experts" are advocating, it would help to know the present status of instruction. What is taught at various levels now? Who teaches this? In what classes or subjects? What materials and methods are used? How is instruction evaluated? Concern here is not only with common but also with uncommon practice. Are there pilot or experimental programs? What are they doing?

Surveys of present status might best be undertaken by any one of a number of large organizations or associations with an interest in what is going on in the schools--The Department of Health, Education and Welfare, Office of Education; the N.E.A.; the National Council of Teachers of English; the American Library Association; the International Reading Association.

A well-designed questionnaire(s) is probably the most feasible means of getting data with which to answer these kinds of status questions. The same instrument(s) could help to locate the places with new and unusual programs, and these could be followed for more detail, perhaps by visits and interviews. Data summaries should describe both common and uncommon practices in detail and should indicate the percentage of schools of each kind employing each practice.

Location and Description of Materials of Instruction

What is available (published or unpublished) to teach these skills? Are they in keeping with what is advocated (reference to "Definition of the Field and Advocated Practice" above)? Are they widely used (reference to "Present Practice" above)? Could an adequate instructional program be built from these materials? What more is needed?

What schemes or devices are available for evaluating the outcomes of instruction in reference skills? What tests or parts of tests are there? How valid and reliable are these? For which skills are there no instruments? What other evaluation schemes or devices are there?

An instructional program does not change without materials to implement the change. Nor does the change long survive without evaluation devices to substantiate its worth. Looking forward to improved materials to facilitate improved programs, it is important to know what is now available with which to instruct and evaluate.

Status Studies of Children's Abilities with Reference Skills

Much is known about children's abilities in reading and their behaviors in reading situations. Very little is known about their abilities or behaviors with respect to the use of reference materials or more broadly about their basic study skills, including library usage. What can children and youth do with these tasks at various levels? How do they behave with a task requiring reference skill? What errors do they make? Are there developmental levels? When or under which conditions can one expect adult-like efficiency? How does ability with these skills relate to other aptitudes and abilities? Answers to the latter question may help to determine where and how they may be best taught. Are reference skills or library skills prerequisite to academic achievement? In all areas? At all grade levels?

The kinds of questions posed here bridge the gap between status and developmental studies. In the sense that each question can be attacked without creating or adapting an instructional program different from that already in practice, one would say that these questions are answered with status studies. On the other hand studies of how children and youth behave with reference tasks may be an early stage in the development of a more effective program. In the study of reference behavior a computer such as PLATO (Programmed Logic for Automatic Teaching Operations) at the University of Illinois, or some other device for observing and recording branching choices, may prove useful.

Developmental Studies on Use of Reference Books

Theoretical Framework

The nature of the reading task and different aspects of it are the subjects of many theories and quite a number of researches to test these theories. Within the reading field theoretical constructs are few dealing with "basic study skills" or with the use of references as a part of "basic study skills." Instruction would best be built upon a theoretical framework well grounded in learning theory, curriculum theory and theory of instruction. Especially pertinent would be constructs concerning the nature of the task and its essential elements, the nature of children and youth as related to these tasks, and principles basic to content selection and instruction.

Developmental Studies of Reference Behavior

There is little reason to believe that a child's attack on reference problems would or should follow an efficient adult pattern. What characteristizes his reference behavior at different developmental levels and under varying conditions? What are reasonable expectations of patterns of behavior at given levels? How do these change at more advanced levels or under different conditions? It is at this point that simulation devices such as PLATO should be especially useful. It is also at this stage of research that observation of individual children in library-oriented, problem-solving or inquiry situations would provide useful data.

The developmental aspects of studies of reference behavior are realized through the creative altering of programs. The intent is to discover what works, how it works, under what conditions it works, and then to develop pilot programs with methods and materials grade-placed in a sequence to reflect the best of the nature of the task and the nature of children with respect to it.

Evaluation is a problem at every step in developmental studies. To know what a child does with a reference task or whether one program works better than another implies continuous evaluation. Much of the creativity in developmental studies is reflected in the ingenuity of evaluative devices developed during each phase of the study. Equally important are the tests of the actual abilities sought. There must be studies in measurement and evaluation leading to the development of adequate instruments and devices.

Development of Pilot Programs

It might follow better logic to lay a solid foundation for pilot programs with status studies and the types of developmental studies described in "Theoretical Framework" and "Developmental Studies of Reference Behavior" above rather than to leap in with a full-blown program lacking this foundation. However, pressures of time, money, and the seeming immediacy of the need have caused scholars in several fields, especially mathematics and science, to develop in recent years extensive pilot programs with little of the type of undergirding mentioned earlier in this paper. It may be that these same conditions and the thought that "anything is likely to be better than what we have" will encourage early pilot programs in the teaching of library and reference skills.

The author of this paper is currently involved in a small pilot program concerned with the teaching of basic study skills, as these are defined by Spache,[13] in three sixth-grade classrooms. This study, supported by Grolier, Inc., intends to contrast the learning of certain basic study skills under three treatment comparisons: (1) ample learning materials and planned instruction; (2) ample learning materials and incidental instruction; and (3) usual classroom materials and only the study skills instruction commonly suggested in basal materials (manuals). The pre- and post-test design includes several measures of basic study skills and reading abilities. There is little that is unique about the planned instruction. Ideas for this were drawn from the literature and instructional materials now available. The teacher using the planned instruction was employed for 160 hours during the summer of 1965 to develop, under supervision, detailed lesson plans incorporating the study skills into the regular program. The supervision of this type of instruction will continue throughout the one-year program.

As research, these types of programs are extremely rough. They will do little more than enable one to make educated guesses about what works and what doesn't. Perhaps a tentative manual can be developed for teaching study skills. Roughly one thousand dollars was spent for materials for each of the classrooms so equipped. About five hundred dollars in each classroom went for materials directly related to teaching study skills (encyclopedias, indexes, laboratory kits, dictionaries, etc.). Perhaps judgments can be made concerning which of these materials are useful or even essential. Later pilot programs might channel their efforts better and might have a better basis for extending efforts to lower and higher grades.

In the opinion of this author there is critical need for each of the kinds of experimentation mentioned in this paper. In his opinion this research should lean heavily upon theory and research in the psychological foundations of education, the field of reading, and that in library education.

The high priority enjoyed by the field of reading in the elementary school, and at least in principle at the junior and senior high-school levels, argues strongly for including research and instruction in the basic study skills as a part of the reading program. Other strong arguments for this location of emphasis come from the fact that the reading program is now fairly fluid beyond the primary grades, the fact that reading authorities accept research and library skills as a part of the reading program, and the fact that there is now increasing pressure for emphasis upon reading instruction at the secondary and college levels. The task then involves the encouragement of research and experimental programs in those aspects of reading dealing with research and library skills.

NOTES

1. George D. Spache, Reading in the Elementary School. Boston: Allyn and Bacon, 1964.
2. Arnold B. Cheney, "A City Wide Effort Improves Study Skills," The Clearing House, XXXVI (February, 1962), 330-32.
3. Ralph Perkins, The Prospective Teacher's Knowledge of Library Fundamentals. New York: Scarecrow Press, 1965.
4. Flossie L. Perkins, "A Determination of the Correlation between the Peabody and Bennett Tests." (Unpublished Research Paper, University of Denver, 1964.)
5. Ralph Perkins, p. 22.
6. Oscar Krisen-Buros, The Third Mental Measurements Yearbook. New Brunswick: Rutgers University Press, 1949. "Peabody Library Information Test," pp. 564-65; The Fourth Mental Measurements Yearbook. Highland Park: Gryphon Press, 1953. "Bennett Use of Library Test," pp. 610-11; The Fifth Mental Measurements Yearbook. Highland Park: Gryphon Press, "A Library Orientation Test for College Freshmen, 1955 Edition," pp. 786-87.
7. Joseph E. Moore, "The Relation Between Library Information and Elementary School Attainment," Peabody Journal of Education, XVIII (July, 1940), 27-31.
8. W. D. Joyce, "A Study of Academic Achievement and Performance on a Test in Library Fundamentals," Library Quarterly, XII (January, 1961), 198-9.
9. Richard D. Walker, "The Influence of Antecedent Library Service upon Academic Achievement of University of Illinois Freshmen." (Unpublished Ph. D. dissertation, University of Illinois, 1963), 113 p.
10. J. Harlan Shores, "Performance of Children on Different Methods of Indexing." (Unpublished study, University of Illinois, 1964.)

11. Automatic Elapsed Time Indicator, produced by Franklin Research, 1922 Bonita Avenue, Berkeley 4, California.

12. Test Timer, Educational Development Laboratories, Huntington, New York.

13. Spache.

PERIODICALS, NEWSPAPERS, AND OTHER SERIALS, DOCUMENTS, TECHNICAL REPORTS, AND PAMPHLETS

by

Patricia B. Knapp

Evidence on the use of non-book printed materials--periodicals, pamphlets, newspapers, documents, and reports--for instructional purposes is scanty or abundant, depending upon one's definitions of "evidence," of "use," and of "instructional purpose," and depending upon one's willingness to make inferences from studies not so narrowly defined.

For discussion of research methodology, it is convenient to group studies into four major categories: (1) citation studies, (2) studies of the use of libraries, (3) reading studies, and (4) studies of teachers' use of free and inexpensive materials.

Citation studies count the references cited in published works and analyze the number of citations in accordance with certain variables depending upon the specific purpose of the study. A crucial problem in such studies is the matter of sampling. Some studies count all references cited in one journal for one period; some take a careful, random sampling of references, for example, by page or by number, within given journals and within given time periods; some count all references cited in a carefully constructed sample of particular units, e.g., doctoral dissertations or the works of certain authors. Studies by Fussler (1948),[1] McAnally,[2] Brown,[3] and Stevens[4] can be particularly recommended for their detailed presentation of the methodologies employed, including underlying assumptions, problems of sampling, analytical and statistical techniques, etc.[1]

In the main, the purpose of citation studies is to determine the dispersion of references cited. Some have been used to develop "most-cited" lists particularly for the guidance of librarians who must make decisions about periodical subscription lists. [illegible]s have attempted to identify objective criteria, for example, language, date, form of publication, and country of publication, to identify little-used materials which might be designated for storage. Still others have been used to estimate the demands upon the library made by students and research workers in various subject fields and thus to estimate the library potential for meeting such demands.

The general limitations of citations as a measure of use are fairly obvious. Unquestionably a footnote or appearance in a bibliography indicates that an item has been used. But the use of other materials also examined but for one reason or another not cited, is not measured. (There is some indication of variation among the disciplines in the degree to which extensive citation is expected or customary.) Furthermore, citation studies offer no evidence on reading which has been internalized and, perhaps, transformed in the mind of the reader.

The specific limitation of citations studies for the purpose at hand lies in the fact that they deal almost exclusively with the use of materials by scholars and scientists rather than that by students. There is some doubt, then, about the legitimacy of including them in a report on the use of materials for instructional purposes. On the other hand, citation studies provide a substantial body of evidence which emphasizes the importance of periodicals, in particular, in the sciences, and if periodicals are important for scientists, should they not be important also for scientists-in-the-making and, indeed, for all students of science?

Studies of the use of libraries have been based on circulation records, on questionnaires submitted to users in the library, to constituents of the library, to librarians, and on interviews with each of these groups. Each of these sources of data is subject to limitations. Circulation studies provide no evidence on in-library use of materials. This limitation is especially significant for non-book printed materials because many libraries do not permit such materials to circulate. Where there is no ban on circulation the nature of the materials themselves discourages it. An article in a magazine or newspaper is easy to read on the spot; the bound volume is an unlikely item to carry home. Government documents and pamphlets which are placed in vertical files or pamphlet boxes, and which may thus be subject to a separate circulation count, are also usually brief enough to be read in the library; those which are longer are usually bound, classified, cataloged and put on the shelf, from which they ultimately circulate as "books." Even those libraries which maintain separate documents collections often duplicate heavily used items for "regular" circulation.

A second problem with circulation studies is that they provide no evidence on the purpose of use, except as it can be inferred from the nature of what is borrowed or from attributes of the borrower. Borrowing, in fact--and this is the most serious limitation upon circulation as a measure of use--provides no firm evidence that the person who borrowed the book read it, nor that it was not read by, or, indeed, borrowed for, someone else.

To get information on the use of materials not charged out, both questionnaires and interviews have been employed. Such studies involve sampling problems (what is a "typical" day? a "typical" week?). The accuracy of the data gathered depends completely upon the respondents' ability to understand the questions asked, their willingness to take the investigation seriously, etc. Furthermore, since asking a patron to fill out a questionnaire or to respond to an interview is inevitably considered something of an imposition on his time, the questionnaire or interview schedule must be brief. This means that questions about types of materials used are often presented in omnibus fashion. (Did you come to the library to (a) study your own books, (b) read books on reserve, (c) consult other library materials?) One investigation, concerned with browsing use of the stacks, (Fussler and Simon, 1961)[5] used an ingenious device to obtain evidence on in-library use of specific volumes in the stacks. This consisted of a questionnaire placed in every volume in the sample being studies and placed in such a way that the book could not be opened without disturbing it. The device was admirably suited to the purpose of the study, i.e., the identification of criteria to determine what books might be moved to storage, but it is more appropriate for a study of non-use than for a study of use.

The difficulty with studies based on responses to questionnaires mailed to the library's constituents is that library users are inevitably disproportionately represented among the returns. Interviews with constituents are similarly limited in value for our purpose. Because they cover people who use the library little if at all, their findings are mostly concerned with the gross demographic variables related to use or non-use rather than with use of particular types of materials.

Library surveys, particularly those which attempt to cover a number of libraries, specific types of libraries, particular collections of materials, etc. often make use of questionnaires submitted to librarians. The difficulty with questionnaire studies of this sort is that the responses are likely to be based on personal observation and opinion. They may reflect subjective impressions, special and immediate pressures, peak work loads, or noticeable events and personalities, rather than everyday use.

In general, library use studies strive to arrive at quantitative measures of the value of the library, its collection, its services, its staff. Their ultimate goal is the improvement of library service. Actually, however, all such quantitative studies raise questions of value--and, in this case, questions of educational value. If, for example, studies show that there is little use of a particular type of materials, are we to conclude that it has little or no value for instructional purposes? And should librarians, then, shift their resources to provide better collections and better services for collections of materials which are in greater demand? Or should we conclude that our studies have succeeded in identifying an unexploited instructional resource, and that librarians should take steps to promote and encourage its use?

Reading studies are based on evidence gathered through questionnaires, interviews, and reading records or diaries. The advantage of the reading record is that it limits the dependence upon the respondent's memory. On the other hand, the very fact of keeping a record may influence the reader's selection of materials to be read. Furthermore, if the preparation of the records is supervised by teachers or by others who are viewed as authority figures, readers may report the reading and only the reading the teacher is thought to respect.

Questionnaires suffer the same difficulty as to possible bias in the direction of the investigator, but an additional problem is that of recall. In order to achieve representativeness, some investigators have asked readers to report on their reading over a relatively long period of time, e.g., six months or a year. In such cases, there is likely to be a substantial loss of data through failure of memory. When, on the other hand, readers are asked to report on their reading in the recent past, e.g., "yesterday" or "this week," the reading may not reflect accurately the total reading behavior of the respondent.

A specific difficulty in connection with reading records and reports as evidence on the use of materials for instructional purposes is their tendency to be particularly concerned with "free," "voluntary," "recreational" reading. This tendency results partly from the high value placed upon reading "for its own sake," which can be thought of as excluding reading for the teacher's sake, i.e., reading for an instructional purpose. At the same time, all schools and colleges want their students to learn to love books, to become life-time readers, and, in this sense, voluntary reading, freely chosen and freely enjoyed by the reader, can be viewed as serving a paramount instructional purpose. In short, we cannot accept at face value either the reader's or the investigator's definition of "use for instructional purposes."

The use of free and inexpensive instructional materials is much discussed in educational literature. Most of the writing, however, consists of lists and descriptions of the wealth of materials available, exhortations that they be used, and "how-to-do-it" articles. Research studies in this area are primarily surveys which have attempted to discover how extensively such materials are used, why teachers do and do not use them, how teachers think they could be improved, etc. They are essentially opinion studies, based on data obtained through questionnaires or interviews with teachers, school administrators, and sponsoring agents. It is possible that there is bias in some cases in the responses and in the reporting of evidence because the investigator was, or was perceived to be, identified with the business or industrial firms which supply materials.

A more serious limitation, however, lies in the fact that in the few cases in which teachers were asked to report on how they used the materials, their answers were not revealing. They used them "for displays and exhibits," "to stimulate individual interests," "to make up for inadequacies of the regular textbook," "to provide contemporary materials." There is no evidence on learning achieved by students as a result of the use of these materials, nor, indeed, on the amount of such use by the students themselves.

This category, nevertheless, provides the only substantial evidence to be found on a type of material, i.e., pamphlets, booklets, leaflets, which is used, and used in vast quantities, for instructional purposes.

The Use of Specific Types of Materials

From the four categories of investigation discussed above it is possible to extract bits and pieces of evidence on the use of specific types of materials. We begin with the least used type and proceed to the most used.

Technical reports -- Bush, in a study of the use of the science library at MIT, using a questionnaire over a five-day period, analyzed the use of 2,757 users, including 1,362 undergraduate and 780 graduate students by the kind of task they performed. He found that there were only 132 consultations of reports for 2,503 consultations of periodicals and 1,433 consultations of books; for undergraduates the proportion was 65 reports to 414 periodicals and 670 books; for graduates the proportion was 33 reports to 1,341 periodicals and 513 books.[6] (Note that figures for borrowing are not included since reports are not permitted to circulate.) What is interesting here is that undergraduates consulted more than 15 per cent as many reports as they did periodicals, while for graduates, the proportion is only 2.5 per cent, and for all users including, presumably, faculty and research workers, it is only a bit more than 5 per cent.

One citation study in physics (Burton)[7] reported that less than 3 per cent of citations were to technical reports (and incidentally that British reports were cited less than American, that there was slowly increasing citation of reports in "more formal" literature, that the median age of reports cited was 2.4 years, and that 86 per cent of the reports cited were government prepared or government sponsored).

Are we to conclude from all this that the undergraduates at MIT are an exceptionally advanced group, that they have not become aware of the superiority of periodicals, that they were led to the reports through a better indexing system of some sort, that they were given an assignment in the report literature, or that the results are accidental?

Government documents -- Information on the use of government publications is most elusive. McCamy's report for the Public Library Inquiry provides the most extensive coverage of this type of material, but it is limited to public libraries and offers no indication as to the purposes for which the documents were used.[8]

Rees used observation and interview to survey the use of federal government publications in the sixteen largest public library systems in North Carolina. He reports that the three libraries which have the largest use of these materials are the three libraries in the largest cities, but that only two have significantly large collections. Students are named as the largest user group by ten librarians, census reports are reported as the most used category of material by twelve librarians. Only six libraries subscribe to the Monthly Catalog, only six order government publications regularly. Eighteen government periodicals are on the subscription lists of three or more libraries, but two libraries subscribe to more than fifty.[9]

From other library use studies, we find that government publications account for five and one-half per cent of faculty "item-use days" at the University of Michigan,[10] and that government publications accounted for 9.5 per cent of the items charged out to faculty at the University of Chicago on one specific day.[11] From a citation study we learn that 12 per cent of the items cited by historians were public documents.[2]

A report on the use of government publications by social studies teachers is based on a questionnaire submitted to teachers who were members of the National Council for the Social Studies, to teachers who were affiliated with a regional organization, and to a selected group of social studies teachers in Minnesota.[12] Responses indicated that the broader the affiliation, the greater the use of the publications, but the average number of documents used per teacher, even for the nationally affiliated group, was only 6.9. Use was associated with the amount of education of the teacher and with the teacher's major. Teachers who had majored broadly in the social studies used more than those who had majored in a specific social science discipline. Documents were used more in medium-sized classes than in smaller or larger ones, and teachers with five classes each day used more documents than teachers with more or fewer.

A questionnaire study of the use of United Nations publications reports returns from nine (out of ten) school supervisors who indicated that periodicals published by the UN are in general use, that the United Nations Review is subscribed to in seven systems and the UNESCO Courier in two. Only four systems reported sales agents for the United Nations as a source of supply for materials.[13]

In sum, the available evidence suggests that government publications play an insignificant part in the instructional program.

Periodicals and back files of newspapers -- There are really two kinds of use of periodicals and newspapers. One can be confidently described as use for research and/or education; the other, as reading less confidently classified as "recreational." The latter is discussed in the next section.

Let us begin with newspapers. From McAnally's study,[2] we learn that 12 per cent of the citations of historians were to newspapers. One library-use study (Flandreau),[14] reports on use of back files of newspapers. The study was based on questionnaires administered to those who consulted back files of newspapers during two two-week periods in each of six midwestern university libraries. The first point to be made is that such use is very light. The average was one and one-half users per day, per institution; the library in which use was heaviest reported an average of two and one-half users per day. Out of a total of 229 users, 168, or 73.4 per cent were students, 30, or 13.2 per cent, were faculty; of the total of instances of use by students, 36 per cent were by graduate students, 63 per cent were by undergraduate students. The purpose of use was reported as follows: 55 per cent for class assignment, 8.7 per cent for research at the Master's level, 10.5 per cent for research at the Ph.D. level, 10.1 faculty research (publication, etc.) and 10.5 per cent personal research. Two out of three of the users were in search of specific items for which they had references. The bibliographical source of references was The New York Times Index, in 38.8 per cent of the cases, and The New York Times was the newspaper used in 62.5 per cent of the cases.

Citation studies provide conclusive evidence that work in the sciences depends largely upon periodical literature. (A recent annotated bibliography of "use studies," by Davis and Bailey,[15] lists 76 citation studies out of a total of 438.) Studies of the use of libraries corroborate the point. El-Shiniti,[11] for example, indicates that almost half of the items "out" to faculty in the sciences are periodicals, while the average for the faculty as a whole is 26.7 per cent. Brown,[3] among others, reports a trend toward rapid obsolescence in most fields, with physics topping the list, and this report on citations is also corroborated by El-Shiniti. Notheisen, reporting on a study of the use of serials at the John Crerar Library, indicates a correlation between use studies and citation studies, analyzed both by date and by language.[16]

Evidence on the use of periodicals specifically by students is less plentiful. As indicated above, Bush reports that in the Science Library at MIT undergraduates consulted periodicals only about two-thirds as often as they consulted books, but that graduate students consulted periodicals more than twice as often as books.[6]

A recent circulation study of the University of Leeds[17] provides interesting data comparing the use of books and periodicals by teaching staff and research workers as contrasted with that of undergraduate students. The survey covered the calendar year 1957, and it covered borrowing of teaching staff, research personnel and undergraduate students. This study is interesting in that it shows something of the same pattern of use as that which was reported in earlier American studies. For example, the average number of loans per student, per year, was 14.77; the number of students who did not borrow any books at all was 14 per cent of those enrolled in the Arts Division, 39 per cent of those enrolled in the Sciences, 39 per cent of those enrolled in Technology, and 26 per cent of the total undergraduate enrollment.

But what is most interesting for our purpose is the contrast between staff and students with respect to their use of periodicals in proportion to books. These figures, adapted from those presented in the report (pp. 5-6), are shown in the following table.

PERIODICAL BORROWING AS A PERCENTAGE
OF TOTAL BORROWING

Field	Teaching and Research Staff	Undergraduates
Botany	52.5	23.8
Chemistry	53.4	16.2
Classics	7.8	0.2
Economics	29.2	6.5
Engineering (Mechanical)	20.1	6.0
English	2.7	1.9
French	5.3	0.1
History	14.9	4.4
Law	22.7	5.3
Mathematics	13.9	0.7
Philosophy	13.0	6.4
Physics	58.2	7.5
Sociology	6.0	5.0

The contrast between undergraduates and faculty use of periodical literature in the Sciences which appears in this study and that between undergraduates and graduates in the Science Library at MIT is striking. It suggests a sharp division precisely at the baccalaureate level. What causes it? If we assume that "new knowledge" appears first in journals, is the implication that undergraduates are being taught only "old knowledge," or that if they learn about "new knowledge" their exposure to it comes only through the mediation of their professors? If we assume that the periodical literature is so technical that it is beyond the undergraduate's capacity, at what point does he acquire the vocabulary and understanding which makes him capable of using it? Are potential scientists lost because initiation to the scientist's characteristic style of work comes too late in the student's career?

Three other studies provide evidence of periodical use at quite a different level. Chapin conducted a study of the references cited in 449 library "research" papers, a random sample of the 2,500 such freshman papers written during the winter term 1956, at Michigan State University.[18] He reports that in a total of 4,937 references, books were cited by 44 per cent, periodicals by 51 per cent, and newspapers by 5 per cent. Forty-seven per cent of the citations were to publications appearing between 1950 and 1956. The top ten periodical titles cited (the *New York Times*, *Science*, and eight news and opinion weeklies) accounted for more than 20 per cent of all citations, for almost 45 per cent of all serials cited.

Benson used questionnaire-with-interview to inquire about the periodical use of students at Wilson Junior College in Chicago.[19] He found that of the students actually using periodicals during the period of the study (five days and five evenings) 44 per cent were using them for class work, and that 86 per cent of these reported such use as "required." Sixty-eight per cent of those doing required reading were working on term papers, 24 per cent had been asked to read on a given subject, and 8 per cent were preparing a speech or were reading a specifically recommended journal. Although 59 per cent of the "required" reading was located through an index (and of 101 index users, 89 used the Readers Guide) 26 per cent was located through browsing. Benson wonders if this method was used because of lack of knowledge of a better one.

The sort of use revealed in these studies affects the public library as well, as it is reported by Martin's study of student use of the Enoch Pratt Library in Baltimore. This study does not offer data on the use of periodicals by students exclusively, but since more than half of the users of the Pratt Library are students and since student use of the library is more intensive in every respect than that of other groups, Martin's comments on the use of periodicals are to the point:

> Present-day educational methods stimulate students to go beyond books to what are thought of as more primary sources. In practice the largest bulk of such work is in periodicals. . . .
>
> The heaviest use is of issues of the past five years. No statistics were obtained for this use from the open shelves, but it is evident from observations that consultation of recent issues constitutes almost one-half of total periodical use. An analysis of call slips for one week (March 4-9, 1963) for pre-1958 issues at Pratt Central showed over one-third of the remaining requests in the 1950-57 period, with an expected falling off for the previous decades. . . . Putting together the open-shelf use of issues of the past five years, plus recorded use of earlier years, shows an estimated 62-64 per cent of non-current periodical use falling in materials of the past ten years.

Noting the preponderance of certain titles, Martin continues:

> There is some element of chance in what titles and years of periodicals are requested by high school students. Many young people appear to have a general topic on which they are seeking background or citations, and they are not particularly discriminating in their selections from the indexes to meet their needs. It may be that certain titles are requested because they are familiar, and certain years specified only because the indexes of given periods happen to be available.[20]

The studies reported in this section reveal two entirely different patterns of use of periodicals and newspapers, yet both are clearly "use for instructional purposes." Are we to conclude that libraries should develop two equally different styles of organizing and servicing their periodical collections, styles which would be appropriate for the two kinds of use which now occur? Or is it possible that teaching methods currently employed stimulate kinds of library use which are out of tune with valid instructional purposes?

Magazine and newspaper reading -- In an early study Adams reported on the library use of 17,616 pupils in 12 junior high schools and 12 senior high schools.[21] These pupils recorded each week under their teachers' direction their library use for one full semester. The results showed that approximately two-thirds of the library "visits" of junior high school students were "reference visits," i.e., for course-related reading, while less than one-half of the visits of the senior high school students were so classified. The type of materials used was reported only in connection with the "non-reference visits." Junior high school pupils reported that of 15,665 "non-reference visits" 9,593 were for newspaper reading and 3,916 were for magazine reading. Senior high school students reported that in 11,868 "non-reference visits" 8,210 involved newspaper reading and 2,455 involved magazine reading. It is possible that these astonishing figures reflect a situation in which the pupils were merely shunted into the library for a kind of "recess" period. A more likely explanation, however, is that the students defined a library visit as a "reference visit" only when it involved supervision by the classroom teacher or reading specifically assigned by her. The teacher and the librarian, on the other hand, may have considered reading which was more or less free or self-selected to be equally in line with educational goals. In any case, it appears to be true that many young people prefer magazines and newspapers to books, and it may be justifiable to regard such reading as, indeed, educational for them.

This is precisely the sort of conclusion Henne reaches in connection with her elaborate and carefully designed reading study which reports on the reading records of 2,927 pupils enrolled in five Chicago high schools in 1940-41.[22] In general the evidence shows that most high school students are regular newspaper readers and that most read magazines extensively. Since many students who will not read books enjoy non-fiction in magazines, magazine reading may be enough for some and it may be a starting place for others.

Some light on the effect of student reading of magazines is reported in a study conducted by the Institute of Student Opinion in 1946.[23] This study indicated that 38 per cent of the students surveyed reported the family as strongest influence upon them, 17 per cent reported magazines and newspapers, 11.5 per cent reported "the gang," 10.5 per cent reported radio, and 5 per cent reported teachers. (This study, of course, pre-dates the widespread use of television.)

Booklets, pamphlets, leaflets -- As indicated above, studies of teachers' use of free and inexpensive materials provide almost the only evidence on the use of booklets, pamphlets, and leaflets for instructional purposes. Such studies deal with what might be called the "jobber" level rather than the "consumer" level of use. Thus they offer no evidence on student use of such materials except in terms of teachers' general statements about it.

Research on this area was covered in an article by Lawler in the Review of Educational Research in 1956.[24] The article indicates that much attention has been given to problems of sponsorship, advertising, and bias in materials supplied by business, industry, and associations. The Commission on Propaganda in the Schools, set up by the National Education Association in 1929, found only four states which restricted use of such materials at the state level. In 1939 two states did so; in 1950 none did. Some states, by 1950, were providing lists of the sources of such materials. But restrictions had not been altogether removed. Control has shifted to the district level and finally to the school level. At the present time, the teachers, themselves, are largely responsible for what is used. In the larger school systems there are often rules and regulations, but these serve as methods of communication rather than as restrictive measures.

The development of methods for teacher selection of free and inexpensive materials is still being worked on. A doctoral study conducted at Stanford reporting on a study of seventeen California schools, indicated that 39 per cent had found such materials hard to obtain, 33 per cent had storage problems, 15 per cent had problems in ordering, using, and maintaining collections of such materials. Thirty-three per cent wanted more materials appropriate for average students, 31 per cent found it difficult to plan for the use of such materials, 15 per cent found it difficult to evaluate student progress on the basis of the use of these materials, and 17 per cent felt insecure in their use of them.[25]

A doctoral study from Teachers College reported that only one system out of 626 in forty-eight states did not use sponsored materials. Responses to a questionnaire to 3,120 superintendents indicated that nine out of ten teachers use sponsored materials. History teachers are reported to have a harder time than others finding satisfactory materials. Three-fourths of the social studies teachers felt that vocabulary and reading level was too high for students, and four-fifths of the teachers felt that there was not enough consideration given to students' interests. Seventeen per cent of the school districts regulate use of materials but there was no evidence of exclusion. Fifty per cent of the districts had selection committees, but many of these were not functioning.[26]

The most extensive study of business-sponsored materials, done by Sinclair in 1949, was based on responses to questionnaires sent to business sponsors, school administrators and teachers.[27] Essentially this was an opinion study. The author reaches the conclusions that (1) everybody uses sponsored materials, (2) there are many lists of available materials, but teachers have only vague notions of where and how to obtain them (most use coupons in professional journals), (3) the types of materials used are, naturally enough, the types most distributed, i.e., booklets, leaflets, and movies and comic books, and (5) teachers prefer movies, slidefilms, and booklets. An indication of the quantities of materials distributed (and note that this is information based on a study more than fifteen years old) was that thirty-seven firms received from 8 to 500 requests per week, four reported 500 to 600, six reported 1,000 to 2,000, and one reported 13,667.

Netzer's doctoral thesis, published in 1952,[28] is limited to the state of Wisconsin, but the data were derived from interviews rather than questionnaires and, therefore, the study provides considerable evidence on the ways in which teachers use the materials. The sample of superintendents and teachers interviewed was carefully constructed (30 cities were selected on a random basis; teachers within each system were randomly selected to represent grades 4, 5, and 6 in the elementary school and six subject areas in the junior and senior high school). It was found that 96.7 per cent of the 621 teachers interviewed were using sponsored materials during the period of the study. The use of such materials related to years of teaching experience more than to level or subject. The reasons for not using such materials were for the most part lack of time, large classes, teacher load, and lack of available space. Less than 9 per cent reported distortion on a controversial issue, 7 per cent reported community censorship, and 6 per cent reported administrative disfavor as reasons for rejecting materials.

Another instructional purpose for which tremendous use of pamphlets is made is adult education. Houle reports that an estimated forty-nine and a half million people were involved in adult education programs in 1955. In addition to magazines and books, such programs use government publications, the pamphlets published by such firms as Metropolitan Life and Household Finance, and, most of all, the specially prepared materials issued by the organizations which sponsor programs, e.g., the Red Cross, the League of Women Voters, etc.

As an example of a coordinated course sponsored by a business firm, Houle notes that Sears Roebuck used a packet of materials in connection with a program which involved 71,000 discussion sessions, conducted by 2,600 leaders for 200,000 employees, at a cost of more than 6 million dollars.[29]

In summary, the evidence on the use of pamphlets, booklets, leaflets, etc., indicates that it occurs everywhere, at all levels of education, and that, in sheer quantity, it is enormous. But the scant attention paid to its educational effectiveness (in comparison with other learning materials, for diverse purposes, and under varying conditions, etc.) suggests that it is not considered a really important type of material.

Implications for Research

This review of the studies of the use of non-book printed materials has led this reviewer to only a few conclusions about the general usefulness of such studies and a few rather tentative conclusions about what might be fruitful directions for future research plans.

1. The abundance of "use studies" and the comparatively little meat to be found in them suggests that it is time to take a different tack. Specifically, we seem to know a good deal more about use of materials than we do about their usefulness, i.e., their effectiveness for learning. In a sense, the focus on types of materials is contrary to the current emphasis in educational circles on the notion of learning resources. The adoption of terms such as "learning resources center" and "instructional materials center" to characterize the library is admittedly faddish and often shallow. But it reflects a principle which is probably sound, namely that education should be concerned with ideas rather than media, with content rather than format. This would suggest that further study of various types of materials should focus not upon their use but upon their comparative usefulness for communicating ideas.

It is true, of course, that studies of the use of various types of materials contribute to the improvement of the administration of the library because its resources are by and large organized by type. But the tendency of librarians to think in terms of form rather than content is also an obstacle to effective use of resources. Pamphlets which are defined as books (and put on the shelf) because they deal with "bookish" ideas are more likely to be used effectively than are pamphlets which regardless of content are defined as "less than 100 pages and paperbound" and filed in a vertical file. Common-sense decisions based upon characterization of materials in terms of content rather than form are likely to be sound. The lack of evidence on the use of some types of materials may result not only from the erasing of the lines between types but also from actual lack of use stemming from a non-functional way of looking at materials.

2. The three quite different types of use of periodicals revealed in the studies suggest that administrative measures be developed to accommodate each appropriately. Typically, the periodical collection is administered as if it were always used as the research worker uses it. We strive for unbroken files, we are loathe to duplicate one subscription at the cost of adding a new title to our subscription list, we rush journals off to the bindery precisely at the time when they are most needed. In short, we treat all journals as if they each contained a unique bit of information. The truth of the matter, of course, is that for high school students and college freshmen, certain general magazines are almost interchangeable. What such students need is simply enough copies--and particularly, enough copies in their own school and college libraries.

   But more important, the appearance of three different types of periodical use suggests that research be directed toward the investigation of the relationship between teaching objectives and the experiences students have as a result of their use of materials. In this connection, Chapin comments on the freshman "research" papers:

> Most teachers defend the paper because: (1) it teaches use of the library; (2) it disciplines students to do investigations of the kind required later in college; or (3) it assures that the student sometime in his college career will grapple with a research problem. I, for one, am not convinced that a 3,000 word paper will fully justify any of these rationalizations. Experience, I think, has shown that students will learn much more regarding library use if they are given not one but a series of exercises. Likewise, the paper does not really offer much to the student in the way of preparing him for later college work. Far too often the requirements--at least ten footnotes, use of all types of printed media, at least ten pages, etc.--are artificial. Many students never again use as many citations. The third rationalization--that the student should do at least one term paper in college--is absurd. If the term paper is of educational value, as I am sure it is, it will be in relation to a content field being studied.[30]

Martin generalizes to reading assignments of all sorts:

> Obviously sheer numbers of books consulted are not a direct measure of education accomplished. Stressing of quantity of reading can force students to rapid and superficial attention to all printed material. Reading can become more a race than an enrichment. Consultation of materials which duplicate previous reading can become repetition rather than progress. Young people in libraries seeking items for the bibliographies of papers sometimes appear to be engaged in a frantic treasure hunt. While one seventh grade assignment encountered, of a paper on Julius Caesar which must cite fourteen sources other than encyclopedias, may be neither typical nor sound pedagogy, it does illustrate a use of reading in the schools which is prevalent and questionable. Assigning of extensive reading can be the easy way out for teachers and rapid consumption of that reading can be activity but not education for students.[31]

3. The evidence showing that use of periodicals in the sciences becomes really heavy only at the graduate level might imply some sort of developmental research aimed at discovering when and how the student of science becomes a student in science. Ennis suggests a conceptual framework in which such investigation might be pursued. He makes a distinction between the two types of audiences which have appeared in use studies, pointing out that (1) the research problem with respect to the general audience has been motivation, while for the specialized audience it has been communication structure; (2) that quantitatively the difference between the two can be described by the ratio of writers to readers; and (3) that:

> Qualitatively, the difference between a general and a special audience is the kind and amount of feedback from reader to writer. In the special audience there is more of the tendency for a member to be, at alternate times, reader and writer, with the channel of recorded knowledge being part of mutual communication. In the general audience the reader simply tends to say yea or nay (accept or reject), to various items transmitted.[32]

Where do students fit in this dichotomy? As "magazine readers" in high school and college they are clearly part of the general audience. But as writers of the freshman "research" paper where are they? On the reader-to-writer scale and on the feedback criterion, they are in the general audience, but the research problem they pose is surely not one of motivation. At what point and by what processes, then, does it become a problem of communication structure? As students advance through college, more and more of "feedback" style of use of resources is expected of them. They are expected not simply to accept or reject but to use information in a critical fashion. The degree to which they develop this capacity to behave like the specialized audience with respect to reading may determine whether or not they ultimately enter its ranks. The evidence of the contrast between graduate and undergraduate use of periodicals in the sciences, where use of periodicals is so important, suggests that use of the literature is at least one element in a screening process. It would be interesting to know whether it functions efficiently or too selectively in identifying those qualified for advanced work.

4. This focus on the student as user of materials (i.e., the equating of "use for instructional purposes," with "user being instructed") suggests that sociological research approaches to the general problem might be productive. The high school magazine reader is part of a "general audience" not only in his reading of magazines but also in his use of other media. As such, he is not just an isolated individual but a member of several groups. Presumably the nature of these groups, his role in them, and so on, has some effect on his use of various media, and even, perhaps, on their educational significance in his life. Similarly, the college student, who may be moving through a sort of transitional stage on his way to becoming a member of a specialized audience, could be studied in the context of his participation in communication systems. (Both of these approaches and additional ones, as well, are discussed in the Ennis article cited above.) Perhaps college students have developed into a specialized audience of their own which is, therefore, subject to analysis and research in terms of its own specific patterns of information-gathering. A recent Newsweek article on the "Pony Boom"[33] indicates enormous increases in sales of a medium not touched on in this Conference, a medium which falls outside the conventional scope of instructional materials, but one which students, themselves, have clearly defined as serving a purpose which society, in turn, defines as educational.

5. Sociological approaches would be appropriate, too, for research into the institutional framework in which use of all types of materials occurs (or does not occur). Surely the use of materials is greatly influenced by the formal and informal social structures which control school systems, individual schools and colleges, the professional, academic, and discipline-oriented associations and information-exchanging networks, etc. A whole area of research is growing up around the notion of the "diffusion of innovation."[34] This would seem to be especially relevant to those who are concerned with both the "old" media of books and journals and the "new" media of films and programmed materials.

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THE USE OF PRINTED AND AUDIOVISUAL MATERIAL FOR INSTRUCTIONAL PURPOSES: AUDIOVISUAL MATERIALS

by

William H. Allen

This paper has a fourfold purpose: to present a general survey of the extent of use of audiovisual instructional materials, to analyze the research on techniques of classroom use, to evaluate the use of audiovisual materials, and to suggest some possible directions of future research. The outcome should give a reasonably valid appraisal of the present state of the art of research on the instructional applications of audiovisual materials.

The term "audiovisual material" will be rather narrowly defined to comprise that class of instructional materials that is either projected visually or presented auditorally: namely, motion picture films, filmstrips, transparencies, television recordings, and radio. For purposes of this paper, research with teaching machines and programmed instruction will not be included. The term "use" will be defined to mean the actual classroom techniques employed in applying audiovisual materials for instructional purposes. The use of the term "research" presupposes some attempt to measure and evaluate the relative effectiveness of various procedures of use by means of some form of controlled experimentation. Therefore, the results and generalization set forth in this paper will be presumed to be based on objective investigation of different audiovisual utilization.

Extent of Audiovisual Materials Use

Although very little research has been conducted to determine the extent to which audiovisual materials are used for instructional purposes, it is apparent to anyone associated with the educational establishment that audiovisual materials are widely employed in teaching. It is also apparent that this use is more extensive in the lower educational levels than in the higher and that the materials are used largely as channels for the one-way transmission of factual information than as resources for individual learners or for the accomplishment of a large range of educational objectives. Many factors contribute to the extent to which audiovisual materials are used: availability of materials and equipment, attitude of the teacher toward this method of instruction, financial support, reaction of the school administrators to audiovisual use, applicability of the technique in particular teaching situations, perceptions of educators as to the function served by the materials, etc. Yet we have little research evidence pointing to the specific reasons audiovisual materials are used, the nature of this use, or the factors contributing to non-use.

The Status of Audiovisual Materials Use

In a series of studies conducted under the auspices of the National Education Association and the United States Office of Education, James D. Finn of the University of Southern California and his staff attempted to assess the growth of instructional technology in the American school systems to 1960. These reports comprise the most complete survey of the present state of the art so far as the growth of audiovisual equipment in schools is concerned and present a useful baseline from which to determine the extent of audiovisual materials use in the past and possible trends in the future. In the first of these studies on audiovisual instrumentation for instruction in the public schools for the period 1930-1960, Finn, Perrin and Campion[19] developed growth curves for standard items of audiovisual equipment over the 30 year period. The pattern of growth showed a decided levelling off of the numbers of motion picture projectors, radios, and opaque projectors in the schools. However, filmstrip projectors, tape recorders, record players, overhead projectors, television sets and language laboratories were enjoying increased growth. It would appear, therefore, that considerable diversification of media was taking place and that, as might be expected, the newer devices such as television, tape recorders, overhead projectors, and language laboratories were receiving considerable attention. In their study of closed-circuit television installations in the schools in 1961, Campion and Kelley[9] discovered that CCTV developed about twice as rapidly in institutions of higher education than in schools; that higher education use of CCTV was centered around "quantity" in terms of audience size rather than "quality" in terms of instructional methods; and that the general pattern in the schools and universities was to teach the on-going curriculum in much the same way it is done in the classroom. Hope[34] in a continuing survey of non-theatrical film and the audiovisual field, found that the money invested in the educational audiovisual field increased 3.6 per cent in 1963 over 1962, that the production of motion pictures increased 2.6 per cent, but that the 16mm motion picture projector sales increased 10.5 per cent (probably through the impact of the National Defense Education Act). The production and sale of filmstrips has climbed steeply, as has the use of 8mm film for instructional purposes.

Thus, this general overview of the status of audiovisual equipment furnishes a basis for some conclusions about the extent of audiovisual use. It would appear that the physical facilities for audiovisual implementation are increasing appreciably where we would expect the increase to occur--with the newer innovations such as television and overhead projectors. Some means of presenting audiovisual instruction have fallen out of favor--radio and opaque projectors; and the prime tool of audiovisual education until the 1950's--the sound motion picture projector--is gaining very little in use. Surprisingly, the filmstrip projector and the record player are continuing a dramatically rapid increase in use begun over 15 years ago. What do these growth figures seem to indicate? When the expected growth of television is excepted--because of its newness--there would tend to be a trend toward the simply operated, less expensive devices and those adaptable to individual use by the student. Although other observations might indicate the increase in complicated multi-media systems, the trend of equipment acquisition appears to be in the opposite direction: toward equipment that can be used by the teacher in the classroom with a minimum of difficulty. Ten years of experience with televised instruction and experimentation with large group instruction have failed to alter appreciably the pattern of classroom teaching; the audiovisual media are still used predominantly as adjuncts to the conventional teaching patterns and are largely under the control of the teacher to use or not to use. This statement does not imply, however, that existing instructional patterns are desirable nor that they will remain stable. The fact remains that such materials are conceived as supplementary and are outside the main focus of instruction except in those rare instances where the curriculum designers have started fresh and developed an entirely new approach to instruction (e.g., high school physics). An analysis of the available audiovisual materials themselves reveals that the producers also conceive their roles as adjunctive to the teacher and the textbook.

Teacher Attitudes Toward Audiovisual Materials

The extent of audiovisual material use is partly a function of the attitudes of teachers toward their use and the perceptions teachers hold of the educational functions served by such materials. Unfortunately, there has been very little substantive research conducted to study this specific problem. Knowlton[38] studied patterns of influence in the high school situation as they affect the use of audiovisual materials and found that, although most high school science teachers did not hold strong attitudes toward the motion picture film medium (but tended to take it for granted as they did the print medium), those who did hold negative attitudes rationalized this attitude by criticizing films and by stating they just did not have enough time to show them. Ramsey[51], during the process of developing a measure for assessing educator attitudes toward the use of audiovisual media, found significantly greater hostility and indifference to the use of media in instruction for a sample of members of the Association for Supervision and Curriculum Development (largely teachers, principals, supervisors and curriculum workers) when compared with a sample of Department of Audiovisual Instruction members. In neither of the above two studies, however, were there any attempts to discover _why_ the unfavorable attitudes were held.

Carpenter and Greenhill[10] studied the attitudes of TV instructors toward closed-circuit televised instruction over a three year period at Pennsylvania State University and noted that there was a gradual increase in favorable attitudes toward the medium. Other studies supported these findings. Evans, Smith and Colville[18] found that university professors favorable to instructional television possessed a greater number of desirable personal and professional characteristics than did anti-ITV professors. In a study of attitudes of school teachers toward the effects of one year's utilization of the Midwest Airborne Television Instruction programs, Hardaway, Beymer and Engbretson[31] discovered that the "rather neutral before" ETV attitude did not change significantly afterward.

Thus, there would appear to be differences in the attitudes and perceptions of teachers toward audiovisual instructional media as such, and these differences seem to be related to individual traits and reference groups. However, we have insufficient knowledge to make any conclusions regarding the nature of these differences, their stability, or the reasons for their existence. The general impression is gained that, in the educational establishment, audiovisual materials and techniques (particularly film and television) are not quite respectable when compared with other instructional materials. One wonders if this is a function of film and television's entertainment heritage, the normal resistance to innovation and change, or the verbally-oriented bias of teachers. Regardless of the reason, the fact remains that the extent of use of audiovisual materials is greatly influenced by the attitudes of the users and that the range of attitudes is greater than for the conventional materials of instruction.

Types of Audiovisual Materials Use

Probably the most commonly held image of audiovisual materials use is that of a teacher standing by a motion picture projector in a semi-dark classroom as an entire class views a film. Or, more recently, the class may be viewing a television receiver. In either case, audiovisual instruction is perceived as having two dominant characteristics: it is passive one-way reception of visual material and it occurs in a group learning situation.

In fact, most of the research in audiovisual education has been conducted in just this setting. Yet the real promise of audiovisual applications to instruction may be in other directions. It is beyond the scope of this paper to present a survey of audiovisual education, but some recent research may indicate the range of recent audiovisual applications and suggest useful innovative practices.

Meeting individual differences in learners--One of the important emphases of audiovisual research concentration in recent years has been that given to the study of audiovisual applications to the instruction of learners with special characteristics: the culturally different, mentally retarded, gifted, etcetera.

Golden[24] used tape recordings to make significant changes in Southern regional speech patterns to those used in Northern urban areas; Cline[11] significantly improved the language arts performance of bilingual Spanish-speaking children by the use of films, filmstrips, recordings, slides, and pictures; but Gordon[24] found that a remedial speech improvement course presented over television to third grade multiracial children in Hawaii had no significant effect on learning.

Driscoll[17], studying the effects of mental retardation on film learning found a need for story-type films and for those that were slowly-paced with sparse narration when used with educable mental retardates. Using televised instruction, Devitt[15] successfully provided intellectual stimulation to gifted students in small rural secondary schools; and Gordon, Engar and Shupe[25] challenged superior elementary grade students by teaching them the Russian language.

Teaching the higher mental processes--Recent research has indicated that the practice of such high mental processes as concept development, creative thinking, and problem solving may be encouraged through the use of audiovisual materials. Torrance and Gupta[59] showed an increase in the creative thinking abilities of fourth grade pupils following a series of 12 planned learning experiences in creative thinking presented by specially prepared audio tapes and teacher guides. The "discovery" method of teaching, using audiovisual materials, was found to be effective in developing transfer of principles and skills learned and in improving the question-asking ability of students.[52,58] However, Dietmeier, Sheehan and Decker[16] found no advantage for a problem solving method over an information giving method in teaching elementary science concepts when presented by television.

Learning task simulation--Increased attention is being given to instruction in situations simulating real life. Kersh[37] simulated 20 sixth grade classroom problems by means of films, slides, and sound for the preservice education of elementary teachers and found that the less realistic (contrary to expectation) simulation modes produced the superior performances by the subjects. On the other hand, Hayes and others[32] found that a driver training simulator using coordinated motion pictures improved the driving skills of high school students and could substitute for actual behind-the-wheel instruction. Beaird and Standish[5] simulated a counseling interview of a seventh grade girl and presented the girl's verbalization of her problem to the counselor trainee by means of tape recordings and found a significant gain in counseling skill.

Viewing of one's own performance--Studying the effectiveness of viewing video tape recordings of counseling interviews, Poling[48] found that counselors were able to discern many aspects of the counseling situation not available through audio tape recordings alone, and their learnings in practicum activities were enhanced. Smith and Clifton[56] studied perceptions of college students toward their performance of several athletic motor skills before and after viewing repetitive loop films of themselves and others performing the skills. They found that the viewing of their own performance, as compared with the viewing of others performing the skills, resulted in a significantly more positive self-concept about their performance. However Schueler, Gold and Mitzel[53] and Johnson and others[35] failed to find measurable gains in improvement of teacher training skills when teachers in training viewed kinescopes or sound motion pictures of their own classroom performance.

Miscellaneous types of use--Recent interest has been shown in the use of speeded speech, up to two and three times normal speed, for the more rapid presentation of recorded material. Orr and Friedman[45] found that media presentation could be speeded up to twice normal speeds without comprehension loss, and Bixler and others[6] and Foulke[20] successfully applied the technique to the teaching of the blind. In a comprehensive paper, "Cine-psychometry," Seibert and Snow[55] have reviewed the literature and discussed the characteristics and potentials of applying film to testing. Cook[12] demonstrated the effectiveness of equipping college students with small transistor radios through which they received broadcasts of Spanish drill exercises in out-of-classroom time as a supplement to their regular Spanish language instruction. Burkhart[8] successfully enriched college courses by telephone interviews of significant national figures or authorities amplified into the classroom.

Techniques of Classroom Audiovisual Use

Specific techniques for the more effective classroom use of audiovisual materials (particularly motion picture films) have been derived from a substantial body of research, and it is possible to categorize them according to the procedures teachers use: class preparation for the material, student participation techniques, class follow-up procedures, repeated use of materials, the intensive use of materials and television presentational methods. Because the research on classroom use of audiovisual materials has been intensively reviewed by Allen (1, 2, 3), only selected studies or those published since Allen's reviews will be included in this paper.

Class Preparation for Audiovisual Use

As might be predicted from research on learning, the establishment of an active set to learn, by preparing the class for audiovisual material to follow, results in significant learning gains. This conclusion is supported by a number of studies, more completely reviewed by Allen (1). Studying aspects of directed attention to parts of a film, Lumsdaine (39) found that learning of these parts could be increased by oral or written instructions, by giving a pre-film test, or by pointing out the hardest questions before a second showing. It would appear, therefore, that learning from an audiovisual communication will be enhanced by such preparation techniques as a study of difficult words or phrases to appear in the material, a study of questions and problems relating to the content, a listing of points to look for, a reading of a brief descriptive story of the content, or the pointing out of the importance of learning the content by means of a simple motivational statement, anxiety-producing instructions, or the announcement of a test to follow.

Student Participation Techniques

The technique of student participation during audiovisual presentation has received intensive research attention and has received almost universal confirmation as a means of facilitating learning. These studies were reviewed in detail by Allen (2). The research showed that such techniques as verbalizing of the content during interspersed practice, answering or describing content during an audiovisual presentation and describing action during a perceptual-motor activity were effective means of increasing learning. The research tends to indicate no significant differences between overt and covert responding (36, 44).

Participation followed by the giving of knowledge of results of responses during participation was found to be one of the most effective ways of increasing learning. Lumsdaine (40, 41) reported numerous studies confirming the value of "feeding back" to the learner knowledge of results, reinforcement, or confirmation of the correctness of his previous response to stimuli presented. Gropper and Lumsdaine (27) compared the relative effectiveness of a conventional junior high school science TV lesson and a TV lesson using sequenced or programmed material that encouraged active student response. They found that when the TV teacher paused just prior to expected responses to allow students time to complete the statements begun and then "fed back" the correct response, learning was reliably increased. Studying the "feeding back" of knowledge of results during the presentation of a filmstrip, Smith (57) found that the groups receiving immediate knowledge of results made significant post test gains over those receiving knowledge of results at the end of the filmstrip, and those who received the knowledge of results at the end of each logical sequence retained the information best when tested three weeks later.

The technique of "mental practice," although inadequately studied, may be a highly effective learning technique.

Class Follow-Up Procedures

The research indicates that follow-up class discussion of the audiovisual material just presented will add significantly to the learning of the factual content of the material. The Australian Office of Education Study (63) indicated that the most effective learning may be gained from a film by introducing it to the class, projecting the film, discussing it immediately, and the next day showing it again.

Repeated Use of Audiovisual Materials

As might be expected, most of what is learned from educational films will be learned during the first showing; but the research indicates that the second showing will probably increase the learning significantly, although not necessarily in proportion to the time spent. In most cases, the showing of the film a second time will result in about as much increased learning as any of the participation techniques.

Intensive Use of Audiovisual Materials

During the past few years considerable attention has been given to studying the effectiveness of audiovisual materials used to provide the major part of classroom instruction. Wendt and Butts (61), in reviewing the research on the saturated use of motion pictures, concluded that motion pictures, at least under certain circumstances, could assume the total teaching load. Popham (48, 49) came to similar conclusions about the use of tape recorded lectures in presenting all the lecture material in a semester-long college teacher education course and a summer session educational research course.

The use of the language laboratory, with its tape players, recorders, and feedback systems, might be characterized as intensive use of audiovisual materials. Mathieu (42) and Hocking (33) reported research on the use of the language laboratory and noted its contributions to language instruction. Young and Choquette (62) studied the relative efficiency of four types of language laboratory equipment--inactivated headphones, activated headphones, playback after recording a practice session, and short delay playback after recording a single utterance. They failed to demonstrate any differences among the treatments in efficiency for learning to pronounce French except for possible lower efficiency on the part of the long delay condition. Comparing performance of students in high school French using audioactive and record-playback equipment in various combinations, Buch (7) concluded that the optimum combination of laboratory experiences was a combination of 80 per cent audioactive with record-playback equipment.

Television Presentational Methods

Limited research has been conducted to discover the effectiveness of various ways of presenting televised instruction. Based on generalizations from the conduct of 12 experiments exploring techniques for using student response to improve televised instruction, Gropper and Lumsdaine (26) concluded that maximum use should be made of TV's audiovisual capability, that TV should maintain the logistic advantage of being able to reach large groups of students at the same time, that elements of systematic control of learning should be built into the instructional situation, and that procedures should be devised to accommodate individual differences in ability to learn despite the group viewing situation. Schwarzwalder (54) studied TV presentation techniques in order to discover how best to use TV as an instructional tool and concluded that planned TV production such as use of superimpositions or visuals facilitated the effects of the televised teacher's efforts and that TV-centered techniques (such as superimposition) in themselves do add materially to student learning, particularly in conjunction with other relevant production techniques. On the basis of analysis of eye movements as subjects watched televised programs, Guba and others (29) made a number of important discoveries, the most important of which were that there was a preoccupation with the face of the narrator when he was on screen to the virtual exclusion of other objects even when these objects were those the scene was intended to dramatize, that subjects will look at a particular point when the narrator draws auditory attention to it, that subjects will switch their gaze to a new object which is introduced into the visual field, and that subjects will soon "surrender" to highly complex or "busy" scenes by hovering or focusing near the center of the screen. The data also suggested that the patterns of eye movements were more related to individual subject characteristics than to differences in visual material. Guba and Snyder (30) probed aspects of teachers' use of TV in the classroom with the following conclusions: (1) the role of the classroom teacher appears to be little affected by the introduction of instructional TV; (2) the patterns of utilization of ITV are conventional and stereotypic, being used largely as a replacement for the telling and showing function; (3) the utilization patterns actually employed by teachers differ considerably from the patterns non-using teachers imagine they would employ, non-users expecting a great deal more from ITV than the users actually find in it; (4) the fears and misperceptions non-using teachers have regarding ITV disappear once experience is gained with the medium, ITV users becoming more favorably inclined toward ITV and new educational media than do non-users; (5) teachers utilizing ITV are generally poorly trained and experienced in this area and are not given enough help; (6) schools are poorly equipped to receive and utilize ITV; (7) ITV production falls far short of the expectation teachers have for it; and (8) ITV is here to stay.

Evaluation of Audiovisual Use

The user of audiovisual materials in the classroom is fairly well restricted to the materials that are available to him. He has little opportunity or time to design or modify existing materials to fit his teaching objectives. Commercially available materials fall into a pattern of mediocrity that discourages use except as the presentation of factual information. As a result, classroom use practices tend to be rather stereotyped and non-creative. Such unimaginativeness on the part of teachers fails to receive any remedial attention because the administrators of school audiovisual programs tend to view their roles as just that--administrative--with an emphasis on materials acquisition, cataloging, and distribution with no time for, or often interest in, the stimulation of fresh and innovative uses or classroom applications. The audiovisual director is often too busy being a custodian of materials and equipment to worry about its use. On the other hand if dependence is placed on the general supervisor or the school principal to encourage creative audiovisual use, an even less favorable state of affairs will prevail. For there is little doubt that this group has a general negative set toward the widespread use of audiovisual media, the reasons for which are not clear. It must be remembered, further, that, in no case, did the supervisor, principal, or the teacher receive his pre-service teacher education from instructors who made even the most elementary use of educational media in his courses.

As we evaluate the use of audiovisual materials, we must not overlook the overriding influence of the inflexibility of the educational structure on the imposition of audiovisual media. For, no matter how you look at it, the use of audiovisual materials in any form is an imposition. Our schools, their curriculums, or their personnel are just not designed for audiovisual materials. With rare exceptions, where forward looking school districts are trying to break this deadlock, the audiovisual educator gains ground only by forcing his materials onto an already existing pattern. Yet the very nature of audiovisual materials, and their probable contributions to the improvement of instruction, requires that they be employed as integral parts of the instructional process. Take television, for instance, and it is apparent that instructional TV today is failing to realize its educational potential at least partly because of the need to adapt it to the existing structure of the school. Yet, if the educational establishment were redesigned completely to conform to today's needs and existing technology, television might play a far different role, possibly that of information carrier rather than as a rather insipid supplement to the "real" instructional program in the schools. Thus, the audiovisual media are fighting for recognition in an existing system and entirely by the ground rules laid down by that system, ground rules that make certain assumptions about the dominance of the printed word. The problem that faces the audiovisual media specialists in this situation is that they need to establish their legitimacy through costly and time-consuming experimentation; whereas the printed word, first to occupy the schoolhouse, need provide no evidence whatsoever to establish its rights as the preferred instructional medium. As a matter of fact, research on the textbook has received only the most cursory attention.[13,14,46] There is little doubt that a double standard of evaluation exists in the domain of instructional materials. It is not the purpose of this paper to establish the case for the wider use of audiovisual materials, but rather to point up some of the problems that exist in attempting to arrive at a valid and unbiased assessment of the roles of the various instructional materials in the classroom.

Other problems become apparent when we evaluate the use of audiovisual materials. The deficiencies of the audiovisualist in his role as implementer of educational change has already been noted. His goal appears to be to get the teacher to use a film, any film, in place of or as a supplement to normal instruction. The instructional appropriateness of the film to the educational objectives is really incidental or is not understood by him.

Thus, by his own actions, he lends substance to the charge that audiovisualists are only interested in the use of audiovisual materials for their own sake without regard to their educational values.

A more fundamental criticism of the audiovisualist is his own failure to understand the nature of the materials he works with. The level of his comprehension of the unique characteristics of the different instructional materials is extremely primitive, despite some attempts to derive principles of media selection.[21,22,26,47] The truth of the matter is that we just do not know what specific types of materials are most appropriate for different kinds of instructional objectives, content being taught, or classroom conditions. There is a kind of generalized belief that "more realistic" materials will make for increased learning, that motion is required to depict things that move, that a picture is more "concrete" than a printed word and thus more effective, etcetera. But these generalizations are based on belief, not on proven fact. One must come to the reluctant conclusion that the specialists in the communication of meaning (audiovisualist, instructional televisionist, librarian, textbook publisher) just do not understand the nature of the tools they work with, the differential effects these different media will have upon instruction, or the optimum ways to use them in combination for the overall improvement of instruction.

Directions for Future Research

What are the critical areas needing research in the future? Certainly, we need to avoid the duplication of previous research in which gross comparisons are made between instruction with audiovisual media and so-called conventional instruction. On the other hand, we need to study media used in combination, in meeting different kinds of educational objectives, in applications to broad educational problems and total segments of the curriculum, and in relation to the education of different kinds of learners. Here is a random list of critical media areas needing study:

1. Attempts should be made to discover the unique educational characteristics of each of the media of instruction and their particular contributions in enhancing learning of different types.

2. We need to know the effects of using combinations of several kinds of educational media over prolonged periods of time, with different kinds of learners, and with varying subject matter.

3. We need to know more about audience-learner characteristics and their relationships to learning from the new educational media.

4. What would be the effect upon learning if a classroom environment were established that provided all the equipment and learning materials needed for both group and individual study? What is the optimum amount of equipment and materials for each classroom? For each school?

5. We need to know more about the effects on learning of still pictures, slides, and filmstrips, which are readily accessible to the teacher at little cost.

6. What are the consequences of large group use of films, television, videotape recordings, and multi-media presentations over a prolonged period of time? On learning? On discipline problems? On the slow learner? On the superior student? On the teachers? On attitudes toward education and learning? On administrative practices? How important is the immediate environment of the learner's own classroom as compared with learning in an auditorium or lecture hall?

7. What would be the effects of using these media as "total" teaching instruments under certain conditions and for certain phases of instruction? What effects will this have upon the factors mentioned immediately above? Are there some teaching objectives that are more effectively taught this way? Some kinds of subject matter?

8. How is the productivity of the teacher increased (if at all) with the use of newer educational media?

9. We need research experience with complete instructional materials packages containing a variety of materials designed to teach the content. What is the proper mix, if determinable, for such packages?

10. What are the factors responsible for effective audiovisual teaching? To what extent do they depend upon the characteristics of the educational media themselves? Upon the way the materials are used in instruction? Upon the characteristics of the learners with whom the material is used?

11. Why don't teachers in service use the audiovisual materials that are available to them. What are the deterrents to optimum use? What are the factors leading to increased and appropriate use?

12. What values do different kinds of supervisory techniques and programs have upon the ways teachers use the newer media?

13. We need to study the attitudes of teachers and school administrators toward the newer media. To what degree may the fear of being replaced by a machine affect the attitudes that teachers have?

14. What effect does the way teachers are taught during their pre-service teacher education programs (other than in audiovisual techniques) have upon their subsequent use of newer media in their classrooms?

15. Full-scale studies need to be planned which team curriculum specialists in the various subject matter areas with specialists in the newer educational media and with textbook specialists to examine the instructional requirements of the area, setting out to implement this in the optimum way using all instructional materials available.

16. What are the basic elements of learning from pictures, both still and motion? Might there be a set of unified principles for learning from visual material of all kinds?

17. How do we develop a "visual literacy" in learners? What and how should they be taught in order to learn how to "read" moving and still pictures and television most fluently and with meaning?

18. What is the relationship between "interest" in material and learning from that material?

19. Further study is needed of production, or "message design", variables with all kinds of media.

20. It is one thing to isolate certain variables under laboratory conditions, yet quite another to get them incorporated by commercial producers and textbook publishers into the media themselves. We need to study how this process may be facilitated.

21. We need developmental research on new kinds of equipment.

22. Certain advantages and disadvantages have been assumed for each of the new educational media. We need to submit these assumptions to experimental study.

23. We need to study the application of the computer to the solution of problems related to the utilization, production, and administration of new educational media.

24. Audiovisual administrative studies are needed on audiovisual library structure, centralization versus decentralization, learning resource center, standards for equipment and physical facilities, procedures for evaluating and selecting instructional materials, cataloging procedures, budgeting procedures, distribution procedures.

A further list of needed research in the introduction and use of audiovisual materials is contained in a committee report edited by Wesley C. Meierhenry.[43]

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EXHIBITS, MODELS AND OTHER GRAPHICS

by

William Dow Boutwell

Origins and Backgrounds

This topic invites attention to the oldest instructional aids known to man. Graphics are as old or older than the wall drawings in the Altamira caves. Models, which may have served the purpose of inspiring or instructing hunters, have been found on floors of prehistoric caves. From pre-Christian graphics came the designs of some letters of our alphabet; our "A" is believed to have come from representation of a yoked ox; our "B" from representation of a standard type of two-story house still to be found in the Middle East. Some Chinese ideographs still portray the reality behind the symbol. Stained glass windows at Canterbury and other cathedrals told Biblical stories to bands of pilgrims before the appearance of the printed Bible. The dominance given to graphics and models before the invention of printing has been reestablished in our contemporary culture through television, films, and modern engraving and reproduction techniques.

Defining Contemporary Areas

Contemporary thinking divides this area of instructional aids into two categories: (1) Models and Exhibits and (2) Graphics.

Models: The historic house, the industrial exhibit, the simulation device, and the reconstructed community (Williamsburg, Virginia, Sturbridge, Massachusetts, and Skansen, Sweden, et cetera) are models on a large scale. Models can also be the reproductions found in museums and are often employed in classrooms for instructional purposes. Examples of the latter are skeletons, demountable parts of the human body, constructions depicting anatomic organization of units of matter, and dioramas.

Exhibits: The line between models and exhibits is not distinct. Exhibits are thought of as three-dimensional combinations of graphics sometimes accompanied by motion and sound to present some concept of service or theme.

Graphics: For the purposes of this paper, graphics will focus on two-dimensional, fixed representations and will exclude presentations that have been put on film or tape. Graphic presentations may be enhanced by motion or sound, as in display advertising.

One director of a large audiovisual center* defines the field as follows:

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*Dr. Robert H. Burgert, San Diego, California.

Models and exhibits fall into many classes and categories. Many of the school supply companies offer maps, scientific instruments, and biological supplies. These range from anatomical models of the human body, parts of the body, and mounted skeletons of mammals and other life specimens, to mineral collections, insect specimens encased in clear plastic, et cetera. Simple machines explain the movement of the earth, sun, moon, and other elements in the solar system. Other devices explain principles of physics, while complex plastic and glass models explain the theories of heredity, DNA, et cetera.

Next there are the industrial types of exhibits. These frequently show processes such as the steps in refining oil, or sugar, or the by-products of a chemical or vegetable product. They may cover samples of textiles, collections of common and rare woods, or a step-by-step display of how a product is fabricated or assembled.

Artifacts cover another general area. A representative school system's collection may contain authentic Indian and Eskimo baskets, utensils, and weapons. A school may draw on museums and private collectors for samples of bead work, pottery, arrowheads, well-organized collections of shells and even the footprints of dinosaurs.

Many items we produce ourselves. These may range from models of a colonial spinning wheel to a hand-carved representation of the arctic walrus, or a covered wagon. We have about 50 dioramas which our artists have constructed over a period of twenty years. These miniature scenes recreate situations (the hardships of the Donner Party or the dangers of flatboating down the Ohio), historic events (the landing of Cabrillo in San Diego Harbor or Gutenberg and his first press), and other incidents.

Graphics include the following:

1. Maps--conventional and special. (In the latter class are picture maps of history, literature, stamp collecting, distribution of religions, races, flora, fauna, et cetera)

2. Posters--these range from technical and scientific to travel posters, safety and first aid charts; process, product, and by-product.

3. Charts (frequently grouped with posters and largely overlapping). These cover everything from periodic tables to time lines and exploded drawings of how to assemble the transmission of an auto to the interpretation of the instrumentation of a satellite.

4. Flat pictures (often termed study prints). These are usually smaller in size and generally arranged in sets around topics. Many concerns offer these in sets or individual prints for

sale. Standard sizes are generally between 8" x 10" to as large as 15" x 20". They are used to create room environment for bulletin boards and displays, to interpret pupil reports or teacher's explanations. Many sets are coordinated to match films or certain commonly used texts. At times they may be projected by means of an opaque projector. They are among the most commonly used and least expensive of visual aids.

A truly creative teacher is able to make a flip chart, a chalk board, or a simple assembly of materials into a meaningful and effective graphic aid. Good pictures, diagrams, and other reproductions clipped from magazines and other publications, properly mounted and captioned can be a most forceful and successful aid to instruction.

Graphic materials find extensive use in early elementary grades where the teacher must take pains to relate new learning in reading and arithmetic to reality or graphic symbols. She accomplishes this with felt boards, cut-outs, blocks, pictures, abacus, games, and other aids.

Some Considerations of Communication Theory

The classic definition of communication has been provided by Professor Harold D. Lasswell, Yale University:

Who
Says What
In Which Channel
To Whom
With What Effect?

Another simple way to describe the "communication" process is this: Communication can make known to the individual what is happening on "the far side of the hill" and each side of time--past and future.

No better example of the function of graphics can be found than the great Rubens series in the Louvre which records in heroic size the courtship (by picture), wedding and married life of a lady on the other side of the Alps (Marie de Medici) and Henry IV of Navarre. These paintings tell viewers about the far side of the hill and attempt to report both past and future. In doing so, the paintings fulfill the same function we expect of printed language.

Lacking symbolic language, primitive man relied on graphic representation. Graphics, as communication, suffered at least two handicaps: (1) the difficulty of reporting when something occurred, and (2) whether what happened was like any other happening; that is, the capacity to represent generalizations and the employment of classification techniques to arrive at abstractions. The Golden Age of Greece was preeminently an age of classification of phenomena and thought. Greek preoccupation with classification survives today in Greek terms used in practically all modern languages. However, in the very process of supplying man with the basic tool of civilization--classification--symbolic language drew away from reality.

Symbolic language--as represented by manuscript writing and later by print--proved a severe hurdle to the learner, and still does. From very early times, therefore, communicators began to supply illustrations to anchor symbolism to reality. Examples may be found in illustrated manuscripts and the earliest illustrated texts prepared by Comenius. Nevertheless, the processes available for illustrating remained for three hundred years at so low a level that the printed word dominated communication. Then technological advance gave communicators ever-increasing opportunity to bring the receiver the reality of what was beyond the hill--the drawing came near to life in the engraving; color added verisimilitude to black and white; film stopped and then soon gave movement to life around us; and finally the arrival of television and Telstar provided instant transmittal of graphic reality to the entire world audience. How to recall or recapture action in full reality remained a problem and this, too, is being solved. New storage and retrieval techniques increasingly assure quick contact with the swiftly accumulating documentation of what has gone before. Communication has finally leveled practically all "hills."

Are we then near the ultimate in communication as an education process when technology provides instant perception and instant recall of reality anywhere in the world? Have we removed the middleman between actuality and the citizen? Are we able to show the citizen what is and enable him to reach his own conclusions and make his own generalizations through the nearest equivalent to "being there"?

The answer is a qualified "yes." Telecasts and recordings of the Pope's visit to New York and the orbital flights gave nearly everyone a seat closer than ring side. But the answer is qualified because what one saw was greatly influenced by the communication middlemen: the producers, the television crews, the announcers and interpreters, the graphics and model designers, and many others. What learning the viewer derived came, then, as much from what was planned that he learn as from his contact with reality through his eyes and ears.

This line of thought may appear to be apart from the assigned subject, but I will try to show that it is not. Retracing to the early thirties, the writer can recall the introduction of the word "realia." Teachers and audiovisual specialists collaborated to bring students in contact with the "real thing"--actuality. They wanted students to touch grains and/or fibers. Packaged exhibits of "realia" were created and distributed and are still being offered and used.

One of the most recent examples of "realia" is the ESI program. Here the producers reproduce examples of materials of a certain period: artifacts from ancient Egypt, documents of the colonial period, et cetera. The teacher asks the children to examine these materials and develop their own understandings and generalizations about the civilizations which the artifacts served. What we have here appears to be the Socratic method in which questions are posed by materials (simulated realia) rather than by words, either the teacher's or the textbook.

One aspect of the Higher Horizons program in New York City also discloses the abiding faith that educators have in "realia." The logic line ran as follows: culturally disadvantaged children seldom leave their slum surroundings. Because they know so little of the world beyond their urban "island," they cannot derive meaning about these phases of the world beyond as presented in books or brought to them on film. Therefore, one must physically take them out of the "ghetto" and introduce them to zoos, museums, public works, monuments, sports, plays, et cetera. This was done through a generous program of guided tours--followed by class activities.

Some questions have now been raised about the effectiveness of Higher Horizons. This is to be expected, because every new road to educational salvation seems eventually to thin out into a rutted lane. No one who has ever observed or participated in a school-sponsored tour to "reality" can question the conclusion that the tour as an educational process is somewhat less than one hundred per cent efficient.

Annually hundreds of thousands of high school students make trips to see the "reality" of government at work in Washington. Their tour includes the Capitol, where the usually empty or sparse-filled chambers convey the apparent "reality" that our nation's legislators are shirking their job. They go to the FBI headquarters, where they are misled into believing that markmanship is important to the work of FBI agents. Their city tour "instructors," the official guides, are commonly underschooled hacks. From this brief exposure to a "model" of U.S. Government, they enter adult life with misinformation that may have wiped away much of the wisdom about the federal government carefully implanted by their social studies teachers.

Why does contact with the real thing fall short as an educational tool? Why is "instant television" of the world, good as it can be, still inadequate?

The answer seems to lie in the fact that the action over every hill is chaotic action. The tour of real government in Washington is not the real thing. No matter how intimately television brings Viet Nam into our homes and classrooms, it cannot fully convey the sweat, the heat, the fear, and the waiting and boredom of war.

If actual visits cannot give us true reports, what can? Artists of all times have tried to tell us about wars on the other side of the hill. The paintings of war by Meissonier and Goya are so different that one can wonder whether they are about the same subject. And yet a Goya drawing may convey the horror of war with more telling effect than a telecaster and a television cameraman at the front in Viet Nam.

The implications for education would appear to be these: (1) what one learns from acquaintance with "realia" depends on what one brings to it (If Thoreau had been a devoted biologist Walden would have been a different book.); (2) middlemen--producers, artists, writers, et cetera,--are essential to the process of bringing the reality of the original model to audiences; and (3) middlemen, no matter how devoted they are to objectivity, cannot be trusted to supply the unvarnished truth to the learner.

Careful historians, it would seem, are no more to be trusted than pictures taken "on the spot." In a recent court case, counsel for Columbia

Broadcasting System tried to offer as supporting evidence of the truthfulness of a script on the Rasputin assassination, quotations from books by six historians. The judge rejected all works by all historians as "hearsay evidence."

Perhaps the most important lesson that the teacher can convey to older students is this: Apply the "caveat emptor" principle to any knowledge communicated from any source. Pictures can lie; so can graphs. And remember that much of what you accept as truth today may not be truth tomorrow.

Contribution from Agencies Outside Normal Channels of Education

Artists, designers, psychologists and other scientists and craftsmen over the ages have made contributions which are now employed in the creation of exhibits, models, and other graphics for instructional purposes.

The role of Walt Disney and his design organization in the New York World's Fair is well known. Disney skills in model making, first applied to the making of motion pictures, were applied to three-dimensional models in Disneyland. At the Fair, Mr. Disney brought model-making to a new peak, technically at least, by giving the model of Abraham Lincoln motion and sound.

The demand by commercial institutions and government for "instruction" by means of exhibits, models, and graphics has led to the establishment of a substantial industry. The U.S. Government has in the Commerce Department a section devoted to the design and preparation of exhibits. Many of these exhibits travel abroad. U.S.I.S. makes extensive use of exhibits.

To further education through agriculture extension, the Department of Agriculture issues a series of "how-to" booklets on graphic presentation. Design principles and techniques developed through public and private agencies have had considerable influence on American museum practice, but they have had little impact on our schools. While our schools have accepted films, filmstrips, records, transparencies, television, and other audiovisual aids as suitable teammates for books in the instructional process, relatively little use has been made of exhibits, models, or graphics. In fact, so little use has been made, that the amount of literature in this area is minor. For so traditional an example of graphics as maps, almost no criteria have been developed to apply to the selection process. As an officer of one leading map company says: "Maps are chosen on the basis of how much and what kind of red appears on them."

One of the most notable advances in the use of models, exhibits, and graphics, as well as other instructional aids, took place during World War II. The military services faced the necessity of training new recruits for a wide variety of skills in the shortest possible time. To do this, the services identified among the draftees men with skills in the audiovisual field and designing. To them they gave problems and almost unlimited money.

The Navy, especially, distinguished itself in applying graphic methods to training. Commander Luis de Florez was assigned to create a

Special Devices Section in the Bureau of Aeronautics. He staffed it with artists, engineers, graphic specialists, and technicians. Visiting the war areas, he brought back problems of training from the battlefront--problems in gunnery, bombing, plane identification, radar use, geographic identification, et cetera. He assigned groups of officers to invent and develop training devices to teach the techniques of sophisticated equipment. Some of these devices were as simple as a set of cards to speed up memorization. Others were complex mock-ups.

The writer recalls a visit to the Navy Special Devices center in Washington where one could sit in a simulated cockpit and either shoot down a German Mig or himself be "shot down." The Link trainer was widely used to prepare pilots.

In Staten Island, the Navy simulated a large convoy of ships under attack by German submarines. Multiple synchronized cameras supplied the simulated action. From this and earlier experiments by Eastman Kodak Company came modern cinerama.

As the war came to an end, some educators asked themselves whether the products of this great leap forward in instructional materials could be applied to peacetime education. Writers were commissioned by the American Council on Education to survey military training aids and report techniques useful in education.

From this effort came a book. The audiovisual specialists mustered out of the service, went back to the schools and colleges eager to transmit their new skills and ideas. Unfortunately, educational administrators paid little heed to pioneering by the military services. Audiovisual aids were permitted to slip back into their old ruts. Little took place until the Russians shocked the country with Sputnik. An aroused country demanded more and better instruction in the sciences. Heeding this demand, Congress quickly passed the National Defense Education Act and backed it with liberal funds for equipment. Much of the money voted has been used to acquire instructional aids and among these aids are models and graphics. NDEA has, of course, now been extended to other curriculum areas and more instructional aids purchased. However, the inventiveness and urgency that spurred the creation of new military training aids cannot be said to mark the new "hardware" for education. Such improvements as have come stem largely from research and development laboratories of major industries.

Some Other Influences on Models, Exhibits, and Graphics

Certain examples of fundamental research can be cited. The Bauhaus group in Germany has had a profound world-wide influence on design. Some of its leaders, fleeing Hitler, came to the United States where they continued their fundamental studies in design. Earlier investigations at Princeton into "dynamic symmetry" appear to have little relevance today.

At the Drake University Visual Research Laboratories, Dr. Herman F. Brandt employed the techniques developed by Dr. William S. Gray at the University of Chicago to chart the eye movements involved in looking at two-dimensional graphic pictures. Gray photographed the eye movements of readers; Brandt photographed eye movements on flat pictures and arrived at findings important for graphic design.

Symbology: This more recent term related to communication factors that go back to the beginning of civilization. Beginning in 1920 Dr. Otto Neurath in Vienna pioneered development of symbols as another language. Neurath's disciple and pupil, Rudolf Modley, came to the United States where he introduced symbolic treatment of data and processes.

"We may divide graphic symbols," writes Modley, "into three different classes: Symbols which are an image of a visual experience; Symbols which are related to such an image; and Symbols to which a meaning has been assigned arbitrarily."

Standardized symbols for the representation of facts--commonly facts of economics or sociology--were developed by Neurath and Modley. Their graphic "language" has enjoyed wide acceptance in the United States.

Another example of the application of symbology may be found in road markers. European countries have adopted a pattern of signs that require no words. The European pattern is now being accepted in Great Britain and some of the standardized traffic signs are to be found in the United States.

In 1960, the Ford Foundation sponsored a Conference on Symbology. Experts from various fields attended and papers were published.

Educators have recognized the importance of symbolic language. Units on map and chart reading are quite common in elementary and secondary school social studies instruction programs.

We can expect more attention to symbology in our life and education in the future. Among the reasons are these: (1) increasing pace of some activities in modern life requires perception more rapid than words permit (Example: The need to identify directions while driving at a high speed); (2) international communication; requirements of "signals" known and instantly comprehensible to persons from diverse cultures.

Modern symbol patterns overcome the disadvantages of pre-alphabet symbols by expressing both tense and abstractions. This is achieved by the symbols employed by Modley and others which retain links to reality. Population figures, for example, can be expressed with stick figure men and women; electric power by turbines, et cetera.

Storage, Retrieval, and Introduction

The third element, "Introduction," is added here because of the increasing recognition of this factor. The flood of the new materials is so great that means must be and are being contrived to introduce teachers to new resources.

Storage: Except for some "graphics" (study prints and transparencies) storage presents an acute problem. No doubt this is one reason for reluctance of educators to make wide use of exhibits and models. Films, filmstrips, records, and tapes occupy less space, weigh less, and are readily transportable.

"Storage" for large exhibits and models tends to be the museum hall, the historic house, the industry, and the exhibit at the audiovisual center of a school system. In museums the exhibit and model can be presented impressively, and expert guides are often at hand to serve visiting school groups. The disadvantage, of course, lies in the relatively small geographic area that can be served.

Graphics: study prints, pages torn from magazines, transparencies--can be stored in the school library, or better yet, in a teacher's own files. There is a trend toward building sets of transparencies to match textbook progressions. This innovation permits the teacher supplied with an overhead projector to enlarge and expand upon the graphic illustrations available in the text.

Retrieval: Our cornucopia of instructional materials is so large and grows so rapidly in abundance that identification and retrieval becomes an ever greater problem. No teacher uses more than a small percentage of the resources that might enrich instruction.

Dramatic progress in indexing and retrieval techniques are taking place to give teachers a faster and more precise guide to enrichment materials. A mammoth volume index of instructional aids was compiled by a professional staff paid from federal funds and published by McGraw-Hill Book Company. New automated guides are making their appearance. One catalog has been developed by the University of Southern California specialists. Others are being issued by groups centered at Syracuse University and the University of Wisconsin. The Association for Supervision and Curriculum Development has sponsored a loose-leaf service of announcement and review of new materials.

Introduction: The flood of new materials also poses the question of how such materials may best be introduced to teachers. Convention exhibits, direct mail promotion, and advertising are the customary showcases for new instructional aids.

The curriculum materials center has become standard in many school systems, although in some instances it is an unused attic rather than a working laboratory. Other means of introducing teachers to exhibits, models and graphics (and other instructional aids) are beginning to appear: closed circuit television programs for teachers and decentralized laboratory-demonstration centers. The San Diego and Los Angeles, California, school systems are developing such centers in different parts of the city where the teachers may see new materials demonstrated--sometimes with classes--and may also be assisted in making their own materials. At the centers teachers can also be introduced to utilization techniques.

Research and Development

In this area the familiar R&D twins should be reversed in order--development and research. Inquiry discloses relatively little research within the school world on exhibits, models, and graphics. Developments, on the other hand, continue to come from both private and public sources.

For research, one must turn to sources outside the schools; investigation into museum practice and more particularly the research and planning that precedes creation of exhibits sponsored by industry. The great companies sponsoring costly exhibits at the recent World's Fair relied on private professional organizations with "know how" far exceeding anything currently available in education. Education, still locked into the world of print and lacking the millions of dollars industry spends on new modes of communication, cannot yet avail itself of exhibit and model services on a modern or grand scale. School systems are not even supplied with the elaborate multi-media instruction and servicing guides (often including graphics, films, et cetera) that are included in the purchase price when the military and private industry purchase new and complex equipment.

It would be useful for some inquiry to be launched into the new educational and training techniques and equipment introduced by industry and the military which have application to elementary, secondary, and advanced education.

How far education lags is illustrated by the contrasts of the World's Fair. On the one hand visitors stood in line to see elaborate exhibits of great corporations. Education, by contrast, was housed in a small building that became a marketplace of hawkers of ball-point pens and souvenirs. A demonstration of the school of tomorrow in this building supported by a few manufacturers of television and other "hardware" inadequately represented education's future. Protests led to renaming the building in the second year as the "Demonstration Center."

Following are areas worthy of further development and/or research:

Concept of "Orchestrating" Instruction: Instruction is generally structured by a course of study implemented with a textbook. With but a few exceptions, all other instructional aids tend to be offered as "supplementary."

Should instructional aids be relegated to a supporting role? Is this the best way for students to learn, and teachers to teach?

Evidences of breakaways from this lockstep begin to appear under the titles of "multi-media"instructional materials. "Multi-media" or "mixed-media" accepts in principle the idea that a learning experience may be reinforced by more than one media. Sound may supplement graphics; books can be teamed with transparencies or film strips. Some "packages" of mixed-media provide instructional programs that can be used independent of the textbook.

Team Teaching: This technique gives teachers time and encouragement to employ a variety of media. The writer has observed a class period of instruction in poetry in which a teacher presented graphics (magazine illustrations, handmade sketches and a clipping from a morning paper) by means of opaque and overhead projectors. The teacher distributed worksheets to the class and then presented results of student work by opaque projector.

The results were dramatic. A class that might have dozed through recitation and teacher lecture came to life through graphics and student participation.

Television: Models and charts and graphics are being widely used in educational television--on national, local, and closed circuit. Guides for preparing educational television programs show teachers how to create and use models and graphics in a media not friendly to print.

"Do-it-yourself" Laboratories: Newer schools are equipped with laboratories and workshops where teachers can create materials for their own implementation of the courses of study. Important centers for this type should be publicized and school architects should be encouraged to provide such facilities. Do courses in teacher education include guidance and experience in "do-it-yourself" instruction aids? Provision for such training is meager and overdue.

The "Discovery" Idea: Borrowed from England, this concept has had greatest impact on the new math, although its application is not limited to any subject. Central to this concept is a shift from teacher managed instruction-drill-test over to a pattern of inductive learning in which the students, when exposed to problems and experiences, discover the concepts and problems underlying an area of human experience and knowledge. In application this process calls for widespread "laboratory" type of experience often involving models and other realia.

Individualization of Learning: This is closely related to the "discovery" principle. Many teachers now tend to put more and more reliance on the learner learning by himself and at his own speed. In application, this process calls for libraries and classrooms to be well stocked with a wide variety of instructional aids. The place of models, exhibits, and graphics in individualization of learning deserves further attention.

One such experiment at Phillips-Exeter Academy, Andover, Massachusetts, deserves mention. At this school, and later at Meadowbrook Junior High School in Darien, Connecticut, two teachers (Hart Leavit and David Sohn) used photographs as a means of stimulating and developing written composition. Results of their experiment and materials for students appear in Stop, Look, and Write, published by Bantam Books.

Student Tours: A visitor to Europe sees scores of student groups visiting museums and shrines and industrial complexes. The tour as an educational experience appears to be taken much more seriously in Western Europe. One sees students with notebooks writing down observations. For older students there is a system of youth hostels where lodging may be obtained at low cost. In Copenhagen an old wooden battleship provides beds and a memorable experience for about 25 cents per student per night. What Europe does in this respect deserves study and report in the United States.

By contrast, there is the sad story of the Bean Blossom, Indiana, senior class tour, as reported by Lillian Ross in The New Yorker magazine a few years ago. Not all senior class tours become so pathetic. Nevertheless, as a long-time resident of Washington, I can testify that student tours are dreaded by many Washington hotel keepers and are often a headache for teacher sponsors. Students return home with sharper memories of midnight capers in hotel corridors than better knowledge of their government.

How different is a visit to colonial Williamsburg, Virginia. The visitor can scarcely escape the orientation film which gives meaning to the buildings to be seen later. At every point he benefits from courteous and knowledgeable guides.

Why cannot Washington, the seat of government, do more to make the senior class visit a satisfying capstone to secondary education? Why cannot there be orientation films on government? Why cannot the grip of the guides' union be broken so that students, at least, can be ministered to by well-educated guides? In Greece, licensed guides are college graduates and are expected to refresh their knowledge in periodic training courses. Why should anything less be acceptable in Washington? Why cannot the guides in our national capital be as good as the guides in Williamsburg and at the United Nations?

One school system that takes tours seriously is Fairfax County, across the river from Washington. Available to teachers--and parents--is a carefully prepared guide to tours near and distant. Instructions to teachers and parents accompanying the groups keep the tour leaders from errors in logistics. Suggestions for preparing classes in advance and follow-ups insure that the school-sponsored tours yield educational benefits.

Other manuals of merit exist in other communities. Some assembly of this wisdom would be welcome by teachers and parents. Such a project could enable the nation to secure better educational dividends from its large investment in museums and historic places.

Maps and Charts: These would appear to be the orphans among instructional aids. Evaluation criteria for both maps and charts are largely lacking. Some curriculums call for units on map and chart reading skills. Where are these units placed? Is it assumed that a child can learn all he needs to know about map reading skills at the fifth or sixth grade? Where does a student learn to be wary of charts? Where does he learn to make charts and know different kinds of charts? The writer has seen excellent units on chart and map reading. So important is this skill to modern man that some investigation of what is being done and can be done in this field of graphics is desirable. The overhead projector, with its capacity to add tense to maps and charts through overlays, opens new doors for these instructional aids.

Graphics for School Beautification: Modern school construction, with its emphasis on cost per square foot, gives us buildings that are modern triumphs of indestructibility. The halls look like lengthy sanitary bathrooms. Beauty has been sacrificed to making life easier for the custodian.

During the hard times of the thirties, first-class artists, recruited and paid through W.P.A., decorated many schools. Now that our country is wealthy and prosperous, we cannot afford, so it appears all too frequently, to give students and teachers and visitors something beautiful to look at and live with. Good prints and even paintings may be obtained at moderate cost. Is it too much to ask that the resources of graphics be studied with the aim of encouraging the beautifying of our schools? Surely we can do something better with school entrances and corridors than the standard glass case squatting against the standard tile wall displaying the standard sport trophies.

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TOWARD THE ACCESSIBLE MOVING IMAGE IN EDUCATION

by

Louis Forsdale

In my opinion there is one matter of such transcendent importance in the current educational film scene that it should be the sole focus of this paper. It is the opportunity which lies before us of making motion pictures accessible to teachers and students, in school and out, through the continued development of the 8mm film gauge in cartridge-loading or other simplified projectors.

I acknowledge the risks of identifying this single problem--accessibility of film--for exclusive consideration. To do that could imply a lack of interest or lack of awareness of other problems or opportunities associated with film in education. Such is not the case. Rather, I feel that the present state of inaccessibility of educational film should be a matter of major concern to students of instructional materials. And, happily, we are at a moment in history where the problem can be alleviated. This coincidence of vital problem and the opportunity of its realistic solution invites the specific focus of this paper.

Accessibility of Instructional Materials

The criterion of accessibility as a measure of educational materials was suggested by me at the Conference on 8mm Sound Film and Education, held in November, 1961, at Teachers College:

> A prime criterion of the worth of any packaged educational material is that it should be available to the learner when and where and as often as he needs it. Materials which do not meet this criterion, whether for technical or financial reasons, are less than ideal. Notice that I said "less than ideal," not "no good," for there are other criteria too, which should be applied to educational material: interest to the learner, aesthetic quality, accuracy, and so forth.

Let me illustrate this criterion of accessibility by the use of a device I think of as the "A Line." "A" stands for "accessibility." [See illustration immediately below.]

A TV or Radio Program	A Motion Picture	A Phonograph Record	A Book -- A Magazine Article
Low Accessibility			High Accessibility

. . . Let the right end stand for easy accessibility of materials to the student. If materials are readily, and randomly, accessible to the student, place them at the right end of the line. On the other hand, if the student has little or no choice over what materials are available to him and when, place them at the left end of the line, which represents inaccessibility.

What materials go at the right end of the line--the end of high accesibility? Clearly books go there, for, of packaged materials in our educational system, books are probably the most readily accessible to the user. Textbooks are checked out and retained for long periods; books are available in the library or the student bookstore; and thousands of paperback titles are available in magazine and drugstores. Furthermore, the book requires no intermediate machine to "read out" the material. Other printed materials such as magazines and newspapers are also easily accessible to the learner.

Moving a bit to the left on this scale--toward lessened accessibility--one finds, for example, phonograph records. Although not quite as accessible as printed materials, the new LP's are not too terribly expensive for a school to buy and, of equal importance, playback machines are moderately priced and generally easy to use. Film strips, too, are increasingly accessible to learners; they are inexpensive and, in many forward-looking school systems a child can check out a simple, inexpensive reader and a film strip and study it at home or at school.

What goes at the extreme left end of the "A Line"--at the end of least accessibility to the student? The prime offender in terms of the criterion which I have set up here is broadcast television. The learner has no control over what program will be delivered when, and he cannot choose to see it again. True, a given program is accessible in the sense that the television set is simple to operate and is widely available, but still one cannot choose to see a program which is not on the broadcast schedule. It has been noted before that television is a train, operating on a track on a schedule. It gets you where the tracks go, when the train comes.

Film also falls near the inaccessible left end of the line, both because our expensive films are carefully locked in centralized vaults and because our projectors are too few and too complicated for all but the highly motivated and trained to operate. . . . But for all this, film has been more like a bus, with a measure of flexibility about it both in route and schedule. Perhaps with 8mm . . . film we can make the bus into a car, handy and ready to take us almost anywhere at will. And like the car, 8mm will come in many sizes and shapes to serve a variety of needs.

I now offer this assertion: every medium which is used to package material for formal educational purposes should be pushed with all vigor toward the right end--the accessible end--of the "A Line." Technology can render no greater service to educational communication.

Ideally, all pertinent learning materials should be instantly available to learners at all times. In theory, I suppose, the solution is central computers storing all of the knowledge of the world, with read-out accessibility everywhere, but this is so exorbitantly expensive now as to make it a wild dream. So, at the moment, is the thought of making all materials available by gigantic multiple-channel closed-circuit television systems, and for the same primary reason of cost.

It seems rational, however, to believe that we can now bring educational film closer to the user with 8mm.[1]

The matter which I call "accessibility" is referred to by Verner W. Clapp, in discussing the handling of print in research libraries, as "local self-sufficiency." Clapp makes this comment about the problem:

> I find it inescapable . . . that if the general research library is in the future to fulfill its function, it must be able to provide its users with immediate access to local collections which will represent an increasingly significant fraction of the total available, and that it will depend less and less upon sharing of resources unless means can be devised to make access through sharing comparable in effectiveness with access based on local availability.[2]

The thrust of Clapp's discussion is that, while inter-library sharing of books can be greatly improved, local self-sufficiency is likely to remain of paramount importance. It is my opinion that in the instructional field, as well as in the research field, such local self-sufficiency, or accessibility, is of equal importance, and that film cannot assume its rightful place as a major educational medium until it is easily accessible to learners.

Motion Pictures Are Not Now Accessible in Education

That motion pictures are not readily accessible in education today is evident to even the most casual observer. The problem, inherent in our 16mm technology, is two-fold. First, 16mm prints are so expensive that they must be kept in central libraries, not in school or classroom libraries; 16mm projectors are also so expensive that they are available only in limited numbers in most school systems. Second, 16mm projectors, even the so-called "automatic threading" models, are more difficult to use than most teachers and students can or will tolerate. The mere act of getting the film to the school, that is, does not solve the problem of seeing the film; it must be run through some kind of viewing machine, most of which are complex, frightening devices.

To state the obvious, inaccessible materials are not used very much; inaccessible film is not used very much. As Project Discovery apparently is demonstrating, where a school is saturated with film and projectors, and where there is a highly motivated and trained staff, higher and better utilization of motion pictures is possible. Project Discovery, Encyclopaedia Britannica Films, The National Film Board of Canada, and Film Associates have placed copies of appropriate motion pictures and film strips in eight elementary schools--one in Shaker Heights, Ohio, one in Washington, D.C., one in Daly City, California, and five in Terrell, Texas. Equipment manufacturers have placed projectors in every classroom and in libraries. Although results of formal studies have not to my knowledge been released,[3] classroom teachers from Shaker Heights have spoken of their increased and more effective use of film because of its easier accessibility.[4] I suspect, however, that the accessibility achieved in these projects is far below the goal which I have in mind. But more of Project Discovery later.

Motion Pictures Can Be Accessible

The two principal deterrents to achieving accessibility of motion pictures in education can be alleviated by adopting an 8mm system. These two barriers, to repeat, are cost and difficulty of using projection equipment.

Cost.--The cost problem has four aspects: the cost of prints, the cost of projectors, the cost of space, and the cost of personnel.

Print costs.--The cost of a motion picture print, like the cost of a book, depends heavily upon volume of sales. With both film and book, if only one copy were made it would obviously be more expensive than would a larger number of copies; the larger the number of copies made, if efficient duplicating equipment is used, the less each copy costs. Malcolm G. Townsley, in a brief analysis of the cost of 8mm prints, concludes:

> . . . It seems to me that . . . efficient production can lower the cost of making [8mm] prints to about half the current level, and only a little more than one quarter the cost of 16mm, but that only the sale of large quantities of prints can bring about a spreading of the amortization to bring down the price to the purchaser.
>
> Experience shows that an educational film producer can expect to sell four hundred to six hundred prints over the life of his negative. If the same distribution patterns were to hold for 8mm, the print price could come down only from $95 to $65, which seems hardly likely to increase the volume. Only some courage on the part of some film producers and some projector manufacturers is going to get us over the hump, but I have confidence that we will make it.[5]

Another factor in print costs, as applied to 8mm motion pictures with sound tracks, is whether costs of 8mm film can be lowered significantly below costs of 16mm prints unless photographic (optical) sound tracks, as contrasted with magnetic sound tracks, are used. John A. Maurer, with others, argues that a photographic track is necessary to solve cost problems, believing that " . . . the cost of producing an 8mm print with photographic sound, with either black-and-white or color film, can be reduced to the order of one-fourth of the cost of producing an equivalent 16mm print of the same subject. [and] . . . . That it is necessary to reach this level of cost in order to open the fields of usefulness that are within the possibilities of 8mm film."[6] Others argue that the photographic track is not a requirement to lower cost, that improved magnetic track technology, of one variety or another, can also lower present costs.[7] Meanwhile, it is encouraging to know that a good 8mm photographic track has been described and successfully demonstrated by Maurer[8] and Kuehn,[9] and two 8mm projectors with photographic tracks are said to be available on the market at the time of this writing.[10]

Projector costs--8mm sound and silent projectors are already available at costs lower than comparable 16mm machines. One hears frequently that costs can be driven even lower with greater attention to simplicity of equipment design.

Cost of space--16mm prints on reels occupy four times the space required for 8mm reels of the same subject. (16mm film is twice as wide and twice as long as 8mm film of the same running time, hence it has four times the mass of the comparable 8mm film.) Storage space for prints, particularly if libraries are decentralized and contain large numbers of prints, is a significant cost factor. 8mm is in a favored position here, although admittedly much of the space-saving advantage is lost when 8mm film is encased in bulky cartridges. And the cartridge is, in my opinion, necessary for a significant breakthrough in increased accessibility of film in education.

Cost of personnel--The personnel costs in acquiring, cataloging, maintaining, distributing, and showing motion pictures undoubtedly is an important factor in the economics of using films in education. I have done less research than I would have liked into economic matters, and my general impression is that there are far fewer studies of economic aspects of educational film use than there should be. With 8mm cartridge-loading systems the only clear point at which savings on personnel can be made is at the point of projection. That is, the student or teacher is his own projectionist with cartridge-8; he seldom is with 16mm film. On the other hand, local libraries of 8mm film will call for paid supervision; so, of course, would local libraries of 16mm films.

Difficulty of projection equipment--The traditional motion picture projectors which have been used through the years in education are so complicated that they discourage, not encourage, the use of motion pictures. The dream of a cartridge-loading projector is an old one, and, indeed, attempts have been made to make 16mm cartridge-loading projectors.[11] The recent rise of the 8mm medium in education is intimately bound to the successful solution of the long-standing problem of making an inexpensive cartridge-loading projector.[12] At the time of this writing, three manufacturers are marketing 8mm cartridge-loading projectors. It is almost certain that others will follow. Informal observational studies which have been made by members of the Project in Educational Communication at Teachers College, Columbia University, show that the cartridge projectors can be used, and are being used, without difficulty by children as young as four years of age, and by adult teachers who have professed fear, or distaste, for the complexities of standard projectors.

The Elements of a Viable 8mm System Exist

The elements of a viable 8mm system for film in education exist. The quality of 8mm film, both in picture and sound, are, in my opinion, quite adequate to most of the tasks of education. The quality of picture has markedly improved through the years as a result of normal developments in the science and technology of photography; sound, too, will improve with continuing attention to that technical problem. As noted, dramatically new 8mm projectors are available now for purchase. Over 2000 titles of 8mm silent cartridge films are probably on the market,[13] and the number is increasing rapidly. Some major agencies have embarked on 8mm programs which point the way for others.

It should be made quite clear, however, that the goal to focus on is accessible film, not on 8mm per se, if other means of achieving the goal can be realized. My colleagues and I have taken a stand on the merits of 8mm as the best means of achieving the goal after detailed consideration of alternative routes, such as other gauges of film (9.5mm)[14] or other means of handling images on 16mm film (such as A/16 Format)[15] or various video tape systems, etc. But the stand which my colleagues and I have taken with respect to 8mm, in company with many others, simply places a bet on what seems to be the best immediate solution after considering questions of cost, quality, hardware readiness, laboratory readiness, etc. Still one must understand that 8mm is, in all probability, a transitional solution. Obsolescence is a constant fact, however; a fact which until recently--with the introduction of microreaders, computerized catalogues, etc.--has not been central to those whose main concern is print. Given the problems which we face today in education which can be approached sensibly through the uses of film, we cannot wait upon the "perfect" system. The major question to ask of a system which is available today and which shows promise of solving some of our educational problems is this: Is this system likely to serve us well for a decade or two? After that time, if the system has resulted in high utilization, a major purpose of accessibility, it will have destroyed its components through wear. Further, moving images can be transferred from one medium or sub-medium to another. That is, motion pictures can be transferred to video tape; 35mm can be transferred to 16mm as 16mm films can be transferred to 8mm. There need be no fear of becoming inescapably bound into a given system.

The Implications of Accessible Film for Research

If my hypothesis is correct that no aspect of film in education is more important than the development of accessible film, then what does this imply for research, past and present?

The most important matter to call to mind is the fact that most research to date about the motion picture in education has been based, quite naturally, upon assumptions growing from the logistical conditions which have characterized the ways film has been used in education for the past several decades. The logistical conditions--conditions which result in inaccessible film--are roughly these: a teacher identifies a motion picture to be used (frequently with inadequate knowledge of what is available), orders the film (frequently after justifying its need with an administrative officer), receives the film on a designated date (generally days, weeks or months later), locates the projector, a darkened room and a projectionist, prays and shows the film, and continues praying until the complete film has successfully been projected. The film is almost invariably shown to a group, such as a class, or the whole school, and it is generally shown once, or, at most, twice. The film is then returned to the central library.

It is crucial to understand that accessible film--film which is in a classroom or a library to be shown on a projector which can be operated without fear by adult and child alike--would so alter the process as to raise fundamentally new questions about every aspect of educational film from the subject of films, to the style of films, to the distribution techniques for film, to the techniques of utilizing film, to the management of film libraries, to the question of who shall make films, etc. Accessible film would make some of the existing research about motion pictures less than adequate to the new situation. Much else would remain to be built upon.

What of the Existing Research on Motion Pictures in Education?

Psychological and sociological orientation--Excellent surveys of the psychological and sociological research literature pertaining to educational film already exist, particularly those done by William H. Allen.[16] While Allen's published reviews of the literature of film research are dated, one suspects that he may use the occasion of this Conference to bring his work up to date. In general, this literature shows that there is much which we can now take as fact about film in education. For example, we can take it as fact that films are useful in teaching, that the way films are used makes a difference in their effectiveness, that teacher attitude is an important factor in whether teachers use films or not, that films are almost always used in groups, that student motivation is important, etc.

Economic/technical orientation--A literature which is probably less well-known among educators is that of the Technological Development Project, directed by James D. Finn. Among many other findings, Finn, Perrin and Campion discovered the fact that the trend in the purchase of 16mm motion picture projectors has not been turning sharply up, as it should in keeping with the growth of technology in general or of certain other devices in particular, such as overhead projectors or film strip projectors. They observe: "Since NDEA, the number of new projectors purchased has increased about 25 per cent above the previous trend, but the number of additions over replacements is doing little more than keeping up with the rate of increase of student population or classrooms."[17] This is a distressing fact, in view of the potential importance of film as an instructional instrument, and in view of the growth of other aspects of educational technology. It is not unexpected, however, in my opinion. There has been little fundamentally new appeal in the motion picture in education, except perhaps for the large "packages" of film tied in with national curriculum efforts. A medium like the film strip, which has grown rapidly, has a set of undeniable appeals:

low cost, ease of use and flexibility of use. Finn acknowledges the importance of equipment design in advancing or retarding educational technology:

> There is no reason to expect a technological revolution in education when the machine portion of the man-machine system cannot deliver due to faulty or careless design. In more simple terms, many teachers will not use films, tapes, slides or filmstrips if it is mechanically difficult to use them, valuable as they may be in the teaching situation; . . .[18]

There is little doubt that the motion picture in education would be stimulated by engineering developments leading to greater accessibility of films.

Engineering studies.--A considerable amount of research has been conducted by scientists and engineers with respect to the problem of making film more accessible, although they have seldom, if ever, used that term. I have already referred to some of them, and it is probably not important for present purposes to go into much more detail, except to say that such studies range across a wide variety of topics which explore important problems associated with accessible "8," such as the design and testing of a projector,[19] a camera cartridge,[20] a laboratory printer,[21] inspection and quality control equipment for a laboratory,[22] "new formats" of 8mm film designed to utilize space on the ribbon of film more efficiently,[23] etcetera.

It is important for educators to be as knowledgeable as possible about engineering developments because there needs to be a continuing dialogue between the two groups. Without such a dialogue the engineer may have no way of knowing how he can best serve the needs of education; similarly the educator may not know what is possible, and practical, without the help of the engineer. Fortunately, the Society of Motion Picture and Television Engineers has welcomed educators, and, through conferences, programs and committees, has demonstrated a real interest in working on educational problems.

Utilization studies.--There have been several studies of film utilization practices, but let me return to the one now in progress which clearly seems to have the most significance for accessible film--Project Discovery.[24] As noted earlier, Project Discovery is a saturation experiment in which eight elementary schools in four cities in the United States have been heavily stocked with films, filmstrips and projectors, and students and teachers have been taught how to use the equipment. Researchers from The Ohio State University are in residence in the participating communities, observing emerging practices. These researchers, quite properly, are not revealing the results of their observations until the first report is published, at the end of May, 1966. Joan Rosengren Forsdale, one of the senior researchers in the Project in Educational Communication at Teachers College, who has spent two days at the Mercer elementary school in Shaker Heights, Ohio, talking informally with teachers, administrators, students and the researcher assigned to that school, makes this observation:

> There is no doubt that film is used a good deal more at Mercer than at most schools, and more fruitfully. For those reasons it is the best prototype that I know of in which to study the problems and possibilities of accessible film. But it is important to note that as good as this Project appears to be, it apparently does not achieve the degree of accessibility for film--the sort of relationship between viewer and medium--which we in the Project in Educational Communication at Teachers College feel can be achieved.[25]

According to Wayne Howell, Director of Research, Encyclopaedia Britannica Films, 8mm films and projectors will soon be introduced into the Project Discovery schools. What is discovered at that point will probably be less than conclusive, however, because of the comparatively small number of films which are now available in 8mm form appropriate for elementary school use.

What Research Is Needed?

For five years members of the Project in Educational Communication of the Horace Mann-Lincoln Institute of School Experimentation at Teachers College have studied the implications for education of 8mm film. The Project has served as the major academic agency inquiring into 8mm developments. In the five years of studying "8" in education, Project members have made hundreds of films designed to exploit the high accessibility characteristics of cartridge "8," have talked with hundreds of teachers and administrators here and abroad, have tried out films and equipment with children, have used a variety of types of 8mm equipment, have consulted with engineers and business men, and have designed special 8mm equipment as a result of this inquiry. Project members have come to a number of hypotheses, or guesses, about what an accessible film revolution (or evolution) might mean in education. Some of these hypotheses are stated below, followed by suggestions for research or investigation which is implied by the hypothesis.

A revolution in educational film in the direction of accessibility will probably mean that:

1. Libraries of motion pictures would be gradually decentralized; many more school film libraries and even classroom film libraries would develop. Film holdings in some of the libraries might soon number in the thousands.

   Problems for further research: how to buy, store, and make these films available? It is probable that accessible film will have to be handled much as print has been in the past rather than as films have been handled in the past. Some films, particularly short ones, may be purchased without preview, just as books and recordings are now generally purchased. Our film cataloging procedures will soon be found inadequate to the new task. Our current storage procedures simply cannot be followed in a day of accessible film. Many of these problems are close to those which librarians have worked with traditionally, and librarians should be invited to study them. Above all, it is important that film cataloging schemes be studied as soon as possible so that we can be prepared lest we become lost in a mass of unlocatable film.

2. New kinds of educational films will be developed. It has become increasingly clear that "accessible 8" is already bringing about the development of film types which are radically new in education. One such type is the short silent loop, ranging from thirty seconds to four minutes in length. The short film makes sense with cartridge-loading equipment, whereas it has not made much sense with projectors which are more difficult to use. The three senior researchers of the Project in Educational Communication--Louis Forsdale, Joan Rosengren Forsdale and John Swayze--have identified nine film types which are emerging as apparently "native" to the 8mm silent loop film alone, of which six have not yet been widely explored. The nine types are: Moving Illustrations, Documentaries, Skill Films, Drill Films, Context Films, Visualized Abstractions, Induction or Deduction Films, Story Films, Hybrid Still/Motion Films.[26]

   Problems for further research: how to stimulate the discovery of new film forms, new film types. This is principally an artistic problem; new media forms arise from dedicated work by people who have artistic insight into the medium. New forms are discovered through intuition, not by the application of scientific principles. Once discovered, of course, they can be tested in other than artistic ways. The clear implication is that funds must be expended on competent persons who want to expand the formal possibilities of the film medium for educational purposes, but who cannot be asked to operate by the rules of scientific inquiry. A near case in point is Norman McLaren of the National Film Board of Canada, whose explorations into the form of animated film have expanded the perimeters of thinking about film. Only by encouraging invention of new film forms can we fight against the stereotyped thinking of educational film makers who do not understand that there is much yet to be learned about forms which are appropriate to educational film.

3. Students will be called upon more and more to "read" films. With more frequent use of films, and with the use of films which may be densely packed with information (because the loop offers opportunity for repeated viewing), student's skill in "reading" film will increasingly be challenged.

   Problems for further research: what is the nature of film "literacy"? If it exists, how can we measure it and how can it be acquired? Although there have been some studies of these problems, much more needs to be done. Of particular value would be the development of "readability" instruments to help assess the difficulty of films, and the development of "film reading" tests to help discover the viewing skills of students. A special point should be made of the fact that accessible film will open up the uses of motion pictures in parts of the world where films have never been used or have been used very little. Every opportunity should be taken to study how these film "illiterates" gain screen "literacy."

4. School boards and school administrators will be required to make difficult economic decisions. If our current educational film systems, built upon 16mm technology, continue to be challenged by "8," the day will come soon when fiscal decisions will have to be made about whether to develop parallel systems of 16mm and 8mm film,

whether to continue with 16mm alone, or whether to move entirely to 8mm. Undoubtedly different solutions will serve different educational institutions.

Problems for further research: what guidelines or criteria can be used in deciding how best to use the school dollar with respect to educational film? This is an exceptionally difficult problem to attack, primarily because we have few good ways of measuring educational output and therefore generally have no good means of determining whether goals are being achieved. Another major problem is that we have not yet faced squarely the question of obsolescence in education. While industry has clear tax advantages in handling obsolescence of plant and equipment, technology is so new as an acknowledged idea in education that we have yet to explore in depth the manner in which government might assist in helping schools deal sensibly with the constant fact of obsolescence.

5. The relationship between film and other media in education will shift dramatically. If film suddenly becomes one of the easiest of all educational media to use, rather than one of the most difficult to use, then it is probable that it will become much more important in our educational enterprise. It should shift from its peripheral position to a much more central role. Under such conditions film would probably be built increasingly into media "packages"--book, film, filmstrip, record and tape study print, all dealing with aspects of the same problem.

   Problems for further research: how shall media be "orchestrated," to use Marshall McLuhan's phrase. How can we go systematically about the task of making sensible "media mixes," in the words of Joan Rosengren Forsdale. Can we move beyond the stages of hunch and expediency in deciding what medium to use for what purpose in the new packages?

6. Film utilizations practices will change profoundly. With ubiquitous film, easily handled by teacher or pupil, new utilization practices almost certainly will emerge. Some of the patterns which can be anticipated, probably with considerable accuracy, are these: greater use of film by individual students or small groups of students; viewing of a film more times than has been general practice in the past; using portions of films more regularly than is now the practice; holding discussions during the showing of silent films; use of more locally made films, etcetera.

   Problems for further research: what utilization practices would in fact emerge in school settings where cartridge-8 abounded in near saturation levels, and how effective would these practices be?

7. Pupil participation with film will increase sharply. An age of accessible film will involve the student much more than he has been in the past with film. This involvement, or participation, will take many forms: searching out and using films alone, working with the film as it is shown (by touching the screen, talking about a silent film while it is being shown, etcetera), and by making films.

Problems for further research. Research has already shown clearly that the viewer's learning increases, often quite dramatically, when he participates with the film in one way or another. The probable fact of greater participation than we have seen to date points to the opportunity for refining our knowledge about how a variety of new participation possibilities might enhance learning through film.

8. The rear-screen projector in a variety of forms is likely to increase in use. "8" is likely to turn one of its major disadvantages into an advantage of even greater importance to education. That disadvantage is that the 8mm image, to date, is a good deal less brilliant than the 16mm image. One way of compensating for this problem has been to use a smaller screen on a rear-projection system. The result is an image similar to a television picture, and one which can be used in a lighted room.

   Problems for further research: how can the rear-screen projector be used to make more active the participation of learners? What would be the implications for school design of an increasing use of rear-screen machines?

9. The attitudes of teachers toward film should become more favorable. It seems obvious that if films were at hand to be used in simple projectors and in a variety of more flexible ways than is now true that teachers would become much more favorably disposed toward using motion pictures in their work. It is possible, however, that the ancient, although thoroughly fallacious, notion of media replacing teachers could arise again.

   Problems for further research: will the attitudes of teachers toward film in fact change, given the conditions noted above?

A Final Comment

In closing, may I remind my reader that in electing not to look at the whole field of film in education, but rather to concentrate on the matter of accessible film, I make two assumptions. The first is that education would benefit markedly by having motion pictures nearer to the point of utilization, to be used on projection equipment which would be simple enough for anyone to use without special motivation or extensive instruction. The second is that these conditions, which I call "accessible film," can be achieved now because of a set of technical advances with respect to 8mm film. I cannot prove that 8mm film is a delivery system superior to all others for purposes of achieving accessible film, so I acknowledge that this is a matter of belief, not of fact. But it is a carefully examined belief.

I am all too aware of the number of "ifs" and "probablys" in this paper--if this happened then that would probably result. I know, too, that my use of the word "studies" has permitted me to introduce much that is hunch or opinion. The simple fact is that if I adopt the point of view which I feel compelled to adopt, I cannot bring more than a minimum of hard research data to bear. Having said that, I still feel that I do not serve myself or this conference well unless I express as clearly as I can the vision which I see, with the hope that it is a vision, and not a mere hallucination.

NOTES

1. Louis Forsdale. 8mm Sound Film and Education (New York: Teachers College Bureau of Publications, 1962), pp 5-7. The illustration did not appear in the original chapter.

2. Verner W. Clapp. The Future of the Research Library (Urbana: University of Illinois Press, 1964), pp. 16-17.

3. Formal study of the results of these experiments in film and equipment saturation is being conducted under the direction of Professor Egon Guba of The Ohio State University. Researchers are said to be in residence in each of the participating communities to observe results.

4. Two teachers from the Mercer School in Shaker Heights, Ohio, spoke of their experiences at an in-service workshop which the author attended as consultant, held at Encyclopaedia Britannica Films in Wilmette, Illinois on October 14, 15 and 16, 1965.

5. Malcolm Townsley, "Costs and Prices of 8mm Sound Prints," 8mm Sound Film and Education, ed., Louis Forsdale (New York: Teachers College Bureau of Publications, 1962), p. 99.

6. John A. Maurer, "Photographic Sound for 8mm Film," Journal of the Society of Motion Picture and Television Engineers, LXX (August 1961), 618.

7. The vast majority of 8mm sound prints today have magnetic sound tracks on them. Extra laboratory steps are required to place this magnetic material on the film and then to place the sound on the track. A photographic sound track, on the other hand, involves only one "pass" through the printing machinery, and thus is cheaper than a process involving more than one "pass." Some engineers have spoken, however, of the possibility of imbedding magnetic material into the film at the time of its manufacture, thus eliminating the necessity of adding the magnetic stripe later. But the problem is very much more complicated than this brief note might suggest.

8. Maurer, pp. 618-24. Mr. Maurer has also repeatedly demonstrated his photographic system publicly on a prototype projector.

9. J. J. Kuehn, "8mm Variable-Area Sound Motion Pictures: Part 2. Recording," Journal of the Society of Motion Picture and Television Engineers, LXXIII (July 1964), 547. A public presentation of this sound system was made by Mr. Kuehn on October 15, 1963, at the Society's Technical Conference in Boston.

10. Viewlex, Inc. of Holbrook, Long Island, New York demonstrated an 8mm projector for prints with photographic tracks in September 1965. The DuKane Corporation of St. Charles, Illinois demonstrated a similar 8mm

projector, said to be manufactured by Toei of Japan, at the SMPTE Technical Conference in Montreal October 31-November 5, 1965.

11. I know of three prototypes of cartridge-loading 16mm projectors: one at Polan Industries in Huntington, West Virginia, designed for the United States Air Force in World War II; another at Astro Dynamics in Cambridge, Massachusetts; the third at the Motion Picture Research Council. In each case the cartridge was operational, but in each case also the cartridge was so complex that it cost a good deal more than the film it contained. The problem of designing a successful and economical 16mm cartridge-loading projector is rooted in engineering facts. 16mm film has four times the mass of 8mm film and twice the linear speed of 8mm film. As a result, 16mm film has not successfully been put into a passive cartridge, that is, a cartridge which simply contains the film. All 16mm cartridges have required machinery inside them to accomplish such tasks as moving the film, forming loops, etcetera. Such cartridges, being expensive, cannot be the basis of an accessible film movement.

12. The Technicolor Corporation in Costa Mesa, California, has marketed for over three years a variety of silent, cartridge-loading 8mm projectors. The Fairchild Camera and Instrument Corporation in Plain view, Long Island, New York, has marketed a sound cartridge-loading 8mm projector for two years. The Jayark Instruments Corporation of New York City has marketed a sound cartridge-loading 8mm projector for about one year.

13. A catalog of silent 8mm loop films is published by the Technicolor Corporation, a manufacturer of 8mm cartridge-loading projectors, under the title, "Source Directory Educational Single-Concept Films available in Magi-Cartridges." The second, and most recent edition (February 1965) lists some 1800 films. We have discovered that the directory is not totally accurate and that the 1800 figure was at that time large. Growth in the production of 8mm silent cartridge loops area has been considerable, however, and I feel that the estimate of 2000 given in this paper is a reasonably good guess.

14. 9.5mm motion picture film, while almost unknown in the United States, is used in Europe.

15. The A/16 Format proposal calls for the horizontal projection of 16mm film which has double rows of pictures on it. The film is projected in one direction, showing the first "track" of pictures and then in the opposite direction, showing the other "track" of pictures. Dual photographic sound tracks are provided. (See Robert L. Neyman and Floyd E. White, Jr., "Horizontal Projection of 16mm Film With Two Tracks of Half-Size 16mm Pictures and with Optical Sound," Journal of the Society of Motion Picture and Television Engineers, LXXII [February 1963], 82-84.

16. See particularly, William H. Allen, "Research on Film Use: Class Preparation," Audio-Visual Communication Review, III (Summer 1955), 183-97; William H. Allen, "Research on Film Use: Student Participation," Audio-Visual Communication Review, V (Spring 1957), 423-451; William H. Allen, "Research on New Educational Media: Summary and Problems," Audio-Visual Communication Review, VII (Spring 1959), 83-91.

17. James D. Finn, Donald G. Perrin and Lee E. Campion, *Studies in the Growth of Educational Technology, I: Audio-Visual Instrumentation for Instruction in the Public Schools, 1930-1960, A Basis for Take-Off* (Occasional Paper No. 6 of the Technological Development Project) (Washington: National Education Association, 1962), p. 35. Emphasis is that of the authors.

18. James D. Finn, "Introduction to the Papers," in Humboldt W. Leverenz and Malcolm Townsley, *The Design of Instructional Equipment: Two Views* (Occasional Paper No. 8, Technological Development Project of the National Education Association of the United States) (Washington, 1962) pp. 3-4. Emphasis is Finn's.

19. R. G. Hennessey, "Compact Rear-Screen Projector for 8mm Films with Magnetic Sound Stripe," *Journal of the Society of Motion Picture and Television Engineers*, LXX (August 1961), 590-92.

20. Arthur C. Mueller, "An Improved 8mm Film Cartridge," *Journal of the Society of Motion Picture and Television Engineers*, LXXIII (December 1964), 1038-40.

21. E. A. Cunningham and George W. Colburn, "A Multiple 8mm Magnetic Sound Printer," *Journal of the Society of Motion Picture and Television Engineers*, LXXII (January 1963), 24-26.

22. Ben Kleinerman, "High-Speed Inspection of Magnetic-Striped Release Prints," *Journal of the Society of Motion Picture and Television Engineers*, LXX (August 1961), 602.

23. C. J. Staud and W. T. Hanson, Jr., "Some Aspects of 8mm Sound Color Print Quality," *Journal of the Society of Motion Picture and Television Engineers*, LXXI (August 1962), 557-62.

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SOME INSIGHTS INTO THE IMPACT OF VARIOUS MEDIA UPON COMMUNICATION AND SOCIAL STRUCTURE

by

Harley W. Parker

I shall attempt the thesis that our varied communication techniques have, by interpenetration, restructured the educational and artistic uses of all media including print, as well as, by the interface of media communication techniques, achieved this restructuring by re-orientating the recipient mind. To present, however, the various cultural and technological factors bearing on the changing sensibilities of the individual in our society requires a very broad canvas indeed. This paper, then, instead of dealing with many specific examples in great detail will rather attempt to explain some of the broader implications of a few media.

Changing Sensory Modalities
(The Icon and the Illustration)

Most psychological tests are in the area of the visual. This seems very strange when we consider that we have certainly entered a world of increasing tactility and the resonating oral rather than the written word. Is what we see necessarily what the Russian sees? Does the farm boy in America see in the same way as the city boy? If we believe that there is a variation in the methods of perception are we not simply acknowledging that each method of communication governs the hierarchical ordering of the sense life?

An interesting way of checking into the sensory preferences of cultures is to examine their art. I use the word "iconic" for those works which are produced in a world where sound, kinesthetics and tactility are highly stressed: "illustrative" for those works which are created in a world of high visual bias, such as the Western European Renaissance.

The people of the Middle Ages, the people of the icon, did not live in a world of sequential time as we understand it. Rather, the Medieval man lived in a world of multi-levelled time.[1] To most primitives, time is cyclic, not lineal. In the same way, all his spaces are unique and unconnected. An insight into this was given by Alex Leighton when he said: "To the blind all things are sudden,"[2] thereby raising into conscious thought the idea that to the sighted man or the man with a visual bias, nothing is sudden. He has perspective based on the connectedness of visual space. It is not commonly understood that it is only the eye which connects spaces. All the other senses create spaces which are autonomous. On the other hand, the Medieval and the primitive man do not use perspective. The tactile mode is easily recognized in art by a stress upon the bounding outline and on pattern. The return to the tactile in our own society can be seen in the clothing of the teenagers. Dark coloured stockings with patterns, shaggy sweaters, heavy tweeds, the wrap-around sports car, etc. are a few of the many manifestations of a developing sensitivity to the tactile.

The importance of this basic distinction between the tactile-oral and the visual should be apparent. For, if the sensibilities of our youngsters are indeed changing then it becomes increasingly necessary to modify our methods for educational input. (See section on testing.)

There are two salient differences between the iconic (tactile) and the illustrative (visual). These are: (1) the illustrative mode creates a single space in a single time and then fills the space with objects; (2) in the iconic, on the other hand, objects create their own spaces which do not exist in a single slice of time. Also, the image in an iconic work does not represent anything, it is. The fact of its existence is the justification for its being.

Man has, spider-like, wrapped his communication web around and about and even into the very viscera of all other men. In such a world there can be no dispassionate survey--only involvement. In The Naked Lunch[3] Burroughs explores the potential of dope to remove content from the world of man, thereby breaking down all separation between man and his environment. This was also the state of being for Medieval and primitive man, and it is the contention in this paper that we are rapidly returning to a similar state under the impact of electronic immediacy. For the media also can be looked upon as "fixes" eliminating separation of man from his world.

The creative people of our world, the artists, the poets and others, as experts in sensory awareness, can give us vital insights into our changing (electronically conditioned) sensory involvement. For it is only they, along with small children, who have the courage and resources to live with the psychic impact of new technology. Most people prefer to live with the content of their environment which is, of course, only the old technology to which they are largely oblivious. People generally see new technology as art forms and therefore as disturbing anti-environments. It is only when the technology has, as it were, faded into the environment that people feel comfortable with it. As technological innovations follow each other in increasing tempo, living in almost complete unawareness of environment becomes more and more difficult. Unfortunately, it does not follow that greater numbers of people will achieve understanding.

The idea of art as societal programming is a thought which never could have occurred to the fragmented Renaissance man. It is, of course, also true that the urgency did not exist. But, it is typical of any preliterate (iconic) art form and it is also true in our world of electric instantaneity. So it is that the students and practitioners of communication media must realize that they simply cannot go on injecting more technological "fixes," showing no real concern for their sociological implications.

Television

The ability inherent in electronic communication to alter the structure of the recipient mind has been underlined recently by an optometric discovery. A report by Dr. Arthur Hurst, (4) an optometrist working in the public schools of Newmarket, Ontario, suggests that children in the primary grades show a developing myopia and are tending to bring the book closer to the eyes; the average near point distance being six and one half inches. At this distance it becomes necessary for many children to suppress, psychologically and physiologically, the function of one eye. The child becomes effectively monocular. Marshall McLuhan and I, in an unpublished paper, have stated that this is an attempt on the part of the child to accomodate himself to the psychological pressures-toward-involvement of the television medium. That the media possess the power of silently imposing their own assumptions has not been sufficiently appreciated. WE must recognize, particularly in those areas explicitly devoted to communication, that we must satisfy the media-generated demands for changing sensory involvement.

Television is a low-definition medium visually. To understand this it is only necessary to compare even the best television picture with a high-definition photograph. It is a normal human response to an ambiguous or low-definition piece of communication to immediately add to the information by calling on further sensory fill-in. Other senses may immediately be brought to bear or else there can occur an imaginative closure. Low-definition input, therefore, results in participation, while high-definition input, because of the lack of necessity for imaginative closure, leads to dispassionate survey, the stance so loved by the literate man.

It is very probable that one of the most crucial problems in education today is the dichotomy which exists between the patterns of organization of traditional disciplines and the structure of the sensory apprehension when this is conditioned by mechanical and electronic communication. To impose the fragmenting principles or organization of traditional disciplines derived from phonetic literacy upon the immediacy of television, for example, is to weaken the logical sequence of literacy, to rob television of its unique capacity for exploration in depth and thus probably to lose one's television audience.

The nowness of now, which is so much a result of the immediacy of electronic media, militates against the development of a sense of perspective in our youngsters. Scientists appear to be constantly testing rats to find out why teenagers become drop-outs. It has been found that if cheese is placed at the end of the maze the rat quickly learns to find his way through. However, if he is rewarded while in the labyrinth he gives up. It has been suggested that the immediate wrap-around rewards of our electronic media have the same effect upon the sense of perspective in the average teenager.

Considering the above, it should be possible to devise a study to ascertain the "television literacy" of dropouts. The test would be based on the perspectives pertinent to the world in which they live. Give these same students the usual academic tests. Then give the television test to achievers in the academic world. Note differences, significances, etc.

The above test should not be limited to content analysis but should be devised to appraise the varieties of modes of thought, i.e., do children with a large TV background tend to think non-sequentially? Does the highly literate child tend to think in a more "logical" manner?

Xerox and Other Do-It-Yourself Media

The use of Xerox and equivalent methods is placing the publisher in an extremely awkward position. Glenn Gould, the Canadian pianist, told me that there is now a tape recorder available, albeit a pilot project, which is quite capable of taking excerpts from many performances of a single musical unit and synthesizing them into a new, integral whole. This is do-it-yourself music with the best musicians at your call. It is, of course, an exact parallel to the use of Xerox where one can now make one's own books by excerpting from many printed books. Paradoxically, perhaps, the Medieval school consisted of just that--making one's own books. This is only one of many instances where the ability of electronic media to return us to modes of education and art, not seen since the Middle Ages, is demonstrated.

I have said in another context that any culture which feeds on its direct cultural antecedents is dying. This is certainly demonstrated in the history of art. To take two salient examples: In the sixteenth century when the Renaissance was in its most creative period it jumped over the Middle Ages to Graeco-Roman times for the formal structure of its art; the late nineteenth century jumped over the Renaissance to Medieval art and contemporary primitive forms. It would seem then, that it is only by the juxtaposition of cultures far enough apart in terms of their sensory modalities that a situation can be created which is sufficiently abrasive to sponsor a great output of energy and creativity. This postulate raises the whole problem of the efficacy of current teaching techniques. We attempt to feed curricula which are essentially nineteenth century into school environments which in most cases are derived from that period (even when the building has been erected since the last war). In other words, there is very little possibility of any constructive interface. It is possible, on the other hand, to consider the idea that the alienation of the young from the educational system via electronic media may be (contrary to the thoughts of most educators) the very factor which allows our youngsters for the first time since the seventeenth century to encounter an interface of dissident cultures. Most people, unless they are artists or children, are not aware of their environment except on rare occasions. The function of creativity has always been the invention of anti-environments in order to stimulate an overview of the existing environment. It may be, therefore, that the educational system, when it is at variance with popular culture, is a proper milieu for the creative act. There is grave danger, however, that in such an interface the traditional modes of education will be the ones abraded. This can only be avoided if the protectors of the written word are prepared to go far afield in an exploratory sense to revitalize the world of print.

It should be possible to create a situation in which all materials and media for creation and production are easily available: cameras, tape recorders, Xerox machines, etc., plus all materials, such as film, tape, etc., plus all equipment for producing and/or using the finished products.

Encouragement should be given to the student to ascertain and work within the limitations of a given medium. Equipment, in other words, should be allowed to restructure subject matter. Understanding and retention should be checked against a group which has learned in the conventional way via the book. Another possibility is to allow free range for the use of equipment in areas related or unrelated to curriculum requirements. This last, however, raises problems in terms of checking against a standard. It should be interesting to study the creative stance engendered by free use of communication equipment. (The word creative is here to be interpreted as the ability to see old subject matter in a new and perhaps unconventional light.)

Magazines and Advertising

In an analysis of one of the popular picture magazines it has occurred to me that there is a clash between the modes of the illustrative and the iconic. Ads are generally iconic and the text follows the old visual mode. The phonetic alphabet by its ability to translate the whole resounding world into abstract signs is, of course, highly visual.[5]

An ad for L'Aimant used the slogan: "Give her L'Aimant before someone else does." It shows an embracing couple. In the Middle Ages the icon expressed a way of life. All times and all spaces of the culture existed in the image of the icon. It was not simply a picture of any mother with any child. Its multi-levelled meanings include the broadest idea of mother love as well as the meaning of the divine. It was a call to worship. Today, advertising also expresses a way of life. All the "good" times and all the "beautiful" spaces of the culture exist in the L'Aimant ad. It is not simply Joe kissing Sally. Its split-level meanings include security, love, children, homemaking, romance, status, success. In fact, everything desirable by our cultural standards is present. It is a call to worship and support a way of life.[6] As opposed to the iconography of advertising the editorial text consists of the same unaccented grey of the typical book page. Possibly one of the salient problems in graphic art is finding the techniques for synthesizing these disparate modes. The answer probably lies in the use of type distortions in the body matter. The distorted word having the potential for both auditory and visual punning can exist, as it were, in many spaces simultaneously. The use of marginal glosses would also tend to eliminate the tedium of the unvarying grey of type matter.

Perhaps the easiest way of understanding a problem is to examine first what is not known--to explore the areas of ignorance. To explore what is known may take a very great deal of time but ignorance is explored very quickly. Our educational system in its typically Renaissance way regards ignorance as a void to be filled--just as it regards space. But, the gaining of knowledge is really impossible without a knowledge of the parameters of ignorance. Most people faced with the necessity of revitalizing the book in twentieth-century terms would start analyzing the book. I suggest that it would be much more fruitful to analyze the audience, for our ignorance of the impact of the printed word in an electronic world is vast indeed.

It is suggested that a test be devised to study the impact of the printed word in the electronic world. Test to ascertain the "advertising literacy" or impact of type distortions on audiences accustomed to the printed format and on audiences accustomed to large doses of advertising format.

Of course, no one completely escapes advertising or its dynamic and unusual use of typography. The very vehemence with which the highly literate anathematize type distortion is a symptom of subliminal awareness of sensory reorientation. Such a test could be based on poetry, one sample printed in the traditional manner, the other utilizing type distortion intended to amplify the poem and explore it in depth. For example, any equivocal quality of the poem could be explored and its aural qualities amplified. Subjects could be examined for insight and retention.

Pop Art

The concept that the function of art is to create anti-environments certainly seems to be borne out in the Pop Art trend. For the placing of a kitchen sink or a highway billboard in an art gallery forces many people to look, really look, at some of these objects for the first time. In other words, Pop Art acts as an environmental control. Although most Pop Artists would loathe the category, I believe this form can be thought of as essentially romantic. For, just as the eighteenth century Romantics constantly contrasted the sublime (larger than man) with the beautiful (man scale) in order to illuminate the environment, so, Pop Art contrasts the sublime (a tremendous corpus of the arts of man under one roof) with mundane artifacts scaled to the size of man. It is interesting to note that Pop artists and advertisers are constantly using type as an art form but not at all in the traditional sense. Under the impact of photo type and various distorting devices we are entering a world of typographic art of which Gutenberg never dreamed. The return to the oral under the impact of electric immediacy has laid much emphasis upon the distortion of the written word--the children, in particular, are delighted to see visual equivalents for the sound of the word.

When a native makes a mask, he doesn't make a work of art; he too, like the Pop Artist makes a tool for environmental control. When the Balinese say they do not have any artists but everybody does everything as well as he can, they are expressing an attitude prevalent in tribal societies. It appears to me that in our own electronically stimulated tribal culture we could well adopt an attitude similar to the Balinese. So many media, from Xerox to the camera, to the tape recorder, are preparing the way to do-it-yourself art of many kinds.

Exhibitions

I believe that one of the primary errors made in the course of formulation of exhibition design is to consider that communication via the printed word takes precedence over that engendered by the design of the exhibition. Or, to put it another way, the design elements are merely expected to fortify the printed exposition. Today, both written exposition with its essentially linear character and contemporary design which is basically nuclear in structure, must work together. It can be expected that each will modify the other. For example, in a design format where the all-at-onceness of tribal organization is desired to be expressed, one would expect to see this idea recognized, not only in terms of label content, but in the very syntax of the copy. It is only by such a tight intermeshing of disciplines that we can hope to communicate successfully.

In the museum world the failure to arrive at a working relationship between the designer and the scholar often results in the latter taking over the role of the former. The scholar feels that he must control the design in order to prevent it modifying what he has to say. All too often he backs himself into the corner of mediocrity and at the best, good taste, which is always the first refuge of the witless. With the scholar's training in lineal exposition he tends to impose this mode upon the organization of an exhibition. The very same thing is encountered when we employ highly literate people in areas such as TV, films, etc. This realization should make apparent the tremendous necessity for training people in these non-literary media, not only in specialist schools, however, but right from the very beginning. We still tend to consider the practitioners of media other than the literary as rather second class citizens. Children must be trained to be "literate" in all those media which condition and will continue to condition their lives. It must be apparent to anyone who appreciates contemporary non-verbal art that modes of exposition today depend upon immediate all-inclusive involvement of the senses of the audience rather than on the sequential mode which places the audience in a passive role.

Marshall McLuhan has said: "The content of any medium is another medium.[7] Speech, for example, is the content of writing. The content of museum presentation is a series of cultures or a variety of scientific disciplines. But, it contains many other media as content also: Writing, telephone, radio, movies, pictures, the sculpture medium via space manipulation and the tactility of surfaces, etc. With multi-media as content of exhibitions, it becomes obvious that the rationale of any one of them as an organizing principle is completely inadequate. Any single medium, as well as presenting us with information, is also a channel for our perceptions. Under the impact of any particular medium we find ourselves structuring our world within the confines of the sensory limitations of the medium. Any medium imposes its own assumptions and so it is understandable that educated people, with their literary bias in our society, fail to comprehend that the sequential method of exposition is not the only possible or desirable one. The complete grip of the rationale of the visual is understandable in the Renaissance, but, today because of the constant shift in methods of exposition we find ourselves in a position to understand the assumptions of media and cultures which do not occur as part of our environment. By moving into new methods of exposition we find ourselves with a vantage point which allows us to have an overview of the assumptions of other media. We must understand, for example, that speech as the content of radio or telephone is very different from speech as the content of writing or TV. This, in turn, must prepare us for the idea that the written word as part of the content of exhibitions is not the same as writing for a book. I would hesitate to decide exactly what form writing for exhibitions should take: It would take many forms depending upon the particular form of presentation. The type of organization of the written material should take its cue from the design, which, in turn, takes its cue from the assumptions of the exhibition medium, the quality of the audience and the particular theme.

Testing

Dr. A. E. Parr, Senior Scientist of the Museum of Natural History in New York, in an article entitled Mind and Milieu[8] states the case for the testing of design solutions so lucidly that I cannot resist quoting him: "Psychological tests based upon verbal responses or upon cognizant selections or arrangement of 'stimulus materials,' mostly of a visual kind, have been developed to a perfection, diversity and sophistication that today give us a usable tool for almost every purpose that can be served by direct probing of the mind." Dr. Parr goes on to say that in the fields of human engineering for scientific purposes these tests are used a great deal. He further suggests that it is time such tests were used for "the systematic improvement of the environment man creates for himself to live in." As communication is so much a part of our environment it is obviously applicable in this field.

In order to arrive at any complete program for testing audience reaction in terms of response to various sensory inputs it would be necessary to bring together teams of widely divergent specialists. It would certainly, for example, require psychologists, social workers, teachers, designers, architects, medical doctors, psychiatrists, specialists in linguistics, as well as many specialists on various cultures and sciences.

In line with the aforementioned ideas, it would be pertinent to devise tests to ascertain the differences in perception between teachers and pupils. The methods of measurement in themselves would be valuable; the probable outcome of such measurements might be invaluable. It might prove that while many teachers "prefer to live with the content of their environment, which is, of course, only the old technology to which they are largely oblivious," children live with the psychic impact of the new technology.

Such a teacher-pupil comparison is particularly apt today when the shift in sensory reception is changing so rapidly.

It would be necessary to differentiate between the ordinary variation in response of adult and (quite arbitrarily) teenager. This I suggest could be done by first testing adults against academic achievers (those following the adult lead) and later against the obviously bright child who does not achieve academically.

It appears that one method for testing perception lies in the area of preference: through what senses does an individual achieve the greatest awareness of an experience?

The Centre for Culture and Technology at the University of Toronto is currently seeking funds for at least three specific investigations. One is already operating under the leadership of Dr. Daniel Cappon, a psychiatrist from the University who is also a member of the Centre. This is a basic exploration of sensory priorities or preferences as these are manifested by various individuals. Th[illegible]ber tested will, of course, give the exploration statistical validity. While the artifacts of any culture are a reliable index to the sensory modalities of that culture, very little has been done on an exploration of the sensory preferences of individuals within a given culture. For too long the nonvisually-orientated child has suffered in our educational system. If we can find the techniques for categorizing students on the basis of their sensory preferences we shall have made a great step forward in educational techniques. The Centre is also hoping to mount an exploratory trip to Greece to investigate the general sensory mores in that country prior to its adoption of television. Greece will have television in approximately two years. This would be a before-and-after experiment for it is the intention to reexamine the sensory patterns making up the social structure after television has had sufficient time to take effect. It is very difficult today to find areas of the literate world which have not yet been exposed to television, and Greece is regarded as one of the more promising of these. The third project is also concerned with an exploration of sensory preferences but, in this case, of school children. Because of the fact that we have great numbers of children from all economic and cultural backgrounds visiting the museum it has been decided to hold the experiment in this area. Any museum, of course, constitutes a remarkable index of the sensory modalities of many cultures. It will be possible, therefore, to conduct the experiment in a variety of environments. This experiment will consist of a console which will allow a student (under supervision) to make a choice of three different kinds of sound at varying intensities and will also provide for the manipulation of varying light intensities of various colours. The problem is to find out to what extent students are interested in matching, i.e., Elizabethan music in an Elizabethan room, coupled to warm, subdued colour; and to what extent are they more interested in making, i.e., creating new unique experience.

The statistical aspect of this survey would be handled by IBM cards at the Data Processing Centre at the University of Toronto. It is intended later to test adults who have spent their early years without electronic media. This, of course, in order to gain some insight into the power of electronic media to restructure the sense life at an early age. Any or all of these projects could operate under the aegis and disciplined skills of the members of the Centre for Culture and Technology.

A test could be devised to study the relative efficacy of speech on radio, TV, telephone, lecture platform. This could conceivably be done by having a number of standardized groups (in terms of academic standing). A talk could then be devised to be given in exactly the same way over the various media. Each group would hear it over one medium. Tests could then be set to ascertain understanding and retention. Still other groups could hear the talk in which an attempt could be made to maximize the effect of each medium using the same material. Groups for testing could be divided in other ways, i.e., engineering students vs. students of the humanities, or just people manifesting proclivities in various directions.

This, though scarcely the test for determining the grammar of speech in various media would give some insight into the efficiency of various communication methods in the teaching of different subjects.

Is it possible, for example, that mathematics could be taught most effectively over some low-definition visual medium such as television?

NOTES

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2. Alex Leighton, My Name Is Legion (New York: Basic Books, 1959).
3. William Burroughs, Naked Lunch (New York: Grove Press, 1962).
4. Arthur Hurst, "Vision and Reading Achievement," Canadian Journal of Optometry (April. 1964).
5. H. Marshall McLuhan, Gutenberg Galaxy (Toronto: University of Toronto Press, 1962).

6. Harley Parker, "Advertising and You," Scope Youth Magazine (Department of Religious Education of the Anglican Church of Canada).

7. H. Marshall McLuhan, Understanding Media (New York: McGraw-Hill, 1964).

8. A. E. Parr, "Mind and Milieu," Sociological Enquiry, XXXIII, No. 1 (Winter 1961).

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INSTRUCTION IN THE USE OF THE LIBRARY AND LIBRARY USE BY STUDENTS

by

Frances Henne

Instruction in the Use of the Library

Definitions and Assumptions

In this paper, library instruction and instruction in the use of the library are used, but it should be noted that other and related terms are commonly employed and have become popular with the current emphasis in elementary and secondary schools on inquiry, independent study, and self-directed learning. These other terms refer to teaching or instruction in study and work skills, in research skills, and in methods of inquiry. Some school libraries today are called learning centers. Variations in terminology in this area, combined with those existing in other aspects of library programs--educational media, instructional materials centers, educational technology, and others--lead one to believe that a glossary of terminology, agreed upon by librarians, audiovisual or media specialists, and others working with instructional materials would be extremely useful. Although not strictly research, a project leading to this end merits consideration for support.

In delimiting library instruction it is essential to place it in relation to its total context: "Learning, with its many elements and variables of what is to be learned and how it is to be learned, what is to be taught and how it is to be taught, constitutes a complex discipline--the core of the educative process. Teaching study skills and methods of inquiry (research) represent but a small segment, and instruction in the use of the library forms only part of that segment."[1]

The Literature of the Subject

The January 1958 - June 1965 issues of Library Literature listed 121 articles on library instruction that appeared in magazines published in the United States. Of these, 8 were general in nature, 65 pertained to elementary and secondary schools, and 48 dealt with the college level of instruction. These articles do not represent total output on the subject, but form a representative sampling of the kinds of material being published. Since the purpose of this symposium centers on research, the writer did not read all of the articles that were obviously descriptive and procedural in nature (the large bulk of them). Nevertheless, sufficient information could be abstracted about these articles to categorize their contents, and this information is presented in tables on the following pages.

Exclusive of handbooks, textbooks, and research studies, four books or monographs of a descriptive or procedural nature were reported for the time period noted, one in the college or university field and three in the school library field.

Faculty and/or student handbooks for specific college library situations numbered 46, a few of these being revisions of earlier editions. One manual on how to use special libraries appeared. The following types of material are represented but are not tallied because the figures would not give a true picture of what unquestionably was issued locally and not reported elsewhere: library handbooks for teachers in elementary and secondary school systems; curriculum guides for library instruction in specific schools and school systems; handbooks or guides for students in elementary and secondary schools; and manuals for student assistants in colleges and in junior and senior high schools. Sixteen textbooks were published: college and university, six; high school, five; elementary school, four; and combined grades, one. Some of these had separate manuals or keys for teachers to use with the textbooks.

Many other materials were produced during this time, but since most of these are usually mimeographed and intended for local consumption only, they are only rarely recorded in the standard indexes of publications. These would include the material distributed to students by school librarians that describes the resources and regulations of the library, the exercises and lessons for library instruction, and the overall program of library instruction for a school or school system, prepared by librarians with or without the assistance of classroom teachers and curriculum specialists. A survey and analysis of the last named category might produce some interesting variations in patterns, and might also lead to some fruitful deliberation about the necessity and wisdom of such duplication of effort as now seems to exist.

Mention should be made of the increased output of one form of the "literature" of the subject--audiovisual materials of all types that have been produced commercially and also non-commercially for local consumption, including transparencies, graphics, realia, tapes, films, filmstrips, and others.

Bonn's research[2] into the "state of the art" in library instruction constitutes an important tool, a major resource in the field of library instruction. This paper will not repeat the literature cited by Bonn, but note some studies that have appeared since then. The purpose of his work is "to review some of the significant contributions from the wealth of literature in the general area of training in the use of the library; to indicate trends, advances, problems, and prospects in the area; and to suggest further studies that may be useful in making a more substantial assessment of the problem and a possible subsequent solution of the problem on all levels of library use."[3] His work consists of seven parts--training in the schools (general), training in elementary schools, training in high schools, the public library and the schools, training in colleges and universities, instruction in non-academic libraries, and tests and testing, and a summary with notes and queries about problems and needed investigations. The volume has a comprehensive bibliography.

TABLE 1

PERIODICAL ARTICLES RELATING TO LIBRARY INSTRUCTION IN GENERAL

	1958	1959	1960	1961	1962	1963	1964	1965
Audiovisual materials:								
Use in library instruction	2	-	-	-	-	-	-	-
Lists of films and other A-V materials	1	-	-	-	-	-	-	-
Production of library instruction aids	-	-	-	-	-	1	-	-
General philosophy and techniques	-	-	-	-	-	-	1	1
Programmed instruction	-	-	-	-	-	1	-	-
Report on library workshops on the subject	-	-	-	-	-	-	1	-

TABLE 2

PERIODICAL ARTICLES RELATING TO LIBRARY INSTRUCTION IN COLLEGES AND UNIVERSITIES

	1958	1959	1960	1961	1962	1963	1964
Cooperation with faculty	-	-	-	-	-	-	1
General discussions (objectives, philosophy, problems, etc.)	-	1	2	1	3	2	2
Procedures:							
General	1	3	1	-	-	-	1
Automation	-	-	-	-	1	-	-
Programmed instruction	-	-	-	-	1	2	2
Use of television and audio-visual materials	1	-	-	1	1	-	-
Exercises for freshmen	-	1	-	-	-	-	-
Orientation programs	-	1	-	2	1	-	1
Use of library in special fields:							
Agriculture	-	1	-	-	-	-	-
Law	-	-	-	-	1	-	-
Medicine	-	-	-	1	-	-	-
Relation to academic achievement	-	-	-	3	-	-	1
Other	1	2	1	1	1	1	1

TABLE 3

PERIODICAL ARTICLES RELATING TO LIBRARY INSTRUCTION IN ELEMENTARY AND SECONDARY SCHOOLS

	1958	1959	1960	1961	1962	1963	1964
Objectives and philosophy	2	2	-	1	3	-	4
Library instruction in subject areas:							
Citizenship classes	-	1	-	-	-	-	-
Science	-	-	1	-	-	-	-
Mathematics	-	1	-	-	-	-	-
Business education	-	1	-	-	-	-	-
Procedures:							
General program and methods	5	1	2	3	5	1	2
Using and producing audiovisual media	-	-	-	1	-	1	2
Programmed instruction	-	-	-	-	-	1	-
Skills to be learned	-	-	-	1	2	-	1
Methods for teaching:							
Reference books and other tools	-	-	-	2	-	2	-
Classification	-	1	-	-	-	-	-
Large group instruction	-	-	-	-	1	-	-
Special and new techniques	-	2	-	-	1	-	-
Instruction for freshmen	-	-	-	-	2	-	-
Course in library skills	-	-	-	-	1	-	-
Test questions	1	-	-	-	-	-	-
Games and puzzles	-	-	-	1	-	-	-
Scheduling in elementary schools	1	-	-	-	-	-	-
Teacher responsibilities	2	-	-	1	-	-	1
Work with gifted students	1	-	-	-	-	-	-
Orienting high school students to college library use	-	-	-	-	-	1	-

Topics represented in twelve Master's theses (not a definitive listing) included orientation programs in colleges, library instruction for college freshmen, relationship between performances on library orientation test and academic achievement, knowledge of undergraduate students about the library, the use of library handbooks, resource units and other practices and principles for library instruction in the elementary school, teaching programs in high school libraries, and library aids.

Three doctoral dissertations and two monographs deal with some aspect of library instruction and teachers. Snyder[4] reports on a special seminar library project in an inter-university program in teacher education. Perkins[5] made a study of 4,170 prospective teachers' knowledge of library fundamentals, as shown by their performance on library tests. The sample represented sixty-nine colleges and universities in thirty-eight states. The results showed that "the respondents are not capable of using library materials adequately, and their knowledge of the available library resources is limited."[6] Although he did not study college students in other fields, Perkins stated that he did not believe their library knowledge would be superior to that of the prospective teachers.

The study conducted by the Research Division of the National Education Association[7] on in-service secondary school teachers and library services, contains material relating to library instruction. Returns were received from 1,468 individuals. Of the 1,457 answering the question about the importance of "training in use of library resources" in the education of high school students, 99.2 per cent stated that it should be part of the education of all students and only 0.3 per cent declared that it should not be. Approximately 20 per cent reported that their schools did not have a program of library instruction, about 13 per cent said they did not know whether the program was adequate, and over 66 per cent judged the program to be adequate. "Nearly 3 respondents in 4 believed that they, as classroom teachers, had a personal responsibility for making the development of library skills a fundamental part of the education of their students."[8] In the study, the replies of the respondents are distributed according to major teaching area. In response to the query about whether their professional preparation had included instruction about the role and function of the library program in the secondary school, 26.5 per cent stated it had not been part of their professional training; 47.7 per cent that it had only been incidentally treated in some classes; 13.1 per cent that it was a definite part of a professional course; and 12.7 that they had had one or more separate courses in library service.

In one part of Sister Peter Claver's study[9] of the use of secondary school libraries, teachers rated the library as being of utmost importance for achieving teaching objectives in English, social sciences, and religion; of considerable importance in science and home economics, and of some importance in other areas. Insufficient preparation about school library programs and resources in their professional education was indicated by the majority of teachers.

Gaver,[10] as one part of her research to determine effectiveness of centralized library service in elementary schools, tested the hypothesis that skill in use of library tools and reference works has a measurable relationship to the nature of the "provision of materials in the schools, i.e., to the library category." Special measuring instruments and tests were scientifically constructed and administered to three pairs of schools (the classroom collection category, the central collection category, and the school library category) under control conditions that would test the hypothesis objectively. The hypothesis was substantiated.

Hagrasy[11] established a "positive relationship . . . between the teachers' background in library skill and reading and their students' achievements in these areas."[12] Hagrasy's sample consisted of four sixth grades in two schools.

Krohn[13] reports on the Shaker Heights experiment, a project that received funds from the Fund for the Advancement of Education and the completed findings of which have not yet been published. The experiment involves initiating and developing an intensive program of independent study skills in two elementary schools and providing these schools with good school library resources, facilities, and services needed to implement the program. Media of all types are used, and opportunities are provided for large group and small group instruction so that students can acquire the types of knowledge and skills for effective independent study. Achievement scores made on special tests by students in the two project schools will be compared with those made by students in other schools in the system. Seventeen skills needed by elementary school students for independent study are noted.

Four tenth-grade English classes were studied (two experimental and two control groups) in the research study of Hastings and Tanner,[14] who explored improving English language skills through systematic library experiences instead of formal English grammar. Results of the investigation showed greater attainments and scores for the library experience group.

Determining correlations between performance in library tests and academic achievement has been the objective of several investigations over a period of time. Joyce[15,16] reports the same experiment in two articles. His investigation correlates the scores made on a library test by 64 seniors specializing in elementary education in a teachers college with their academic records. No other data about the students or their program or their backgrounds are given. Joyce concluded that "a significant and positive relationship was established. Those scoring higher than the median on the library test tended to have higher four-year course averages than those who scored below."[17]

Josey[18] received 397 replies from questionnaires sent to 500 colleges and universities inquiring about various aspects of instruction in the use of the library. His findings showed that 27 per cent of the sample had a required formal course in library instruction; 45 per cent gave one lecture or guided tour during orientation week; 19 per cent held several lectures during orientation week; and 59 per cent incorporated library instruction in freshman English. Ninety-five per cent of the sample affirmed the belief that library instruction should involve the cooperation of the library staff. In an earlier study, Mishoff[19] identified 563 colleges and universities in a survey of nearly 1,900 institutions, that had a catalog listing of a library course of some type--library instruction or library science, at the undergraduate level.

The Southern Illinois University study[20,21] experimented with the feasibility of turning library instruction for college freshmen over to teaching machines. Four sections of freshman English classes used the teaching machine only, four sections covered the same content from lecutres, and four received no library instruction. Tests were administered before and after the experiment, which covered a five week instructional period. Students receiving no instruction did significantly less well than students with instruction. Although there was no significant difference between the achievement of the machine group and the lecture group, those directing the study felt that the programmed instruction had contributed definite advantages.

A major and important study that has attracted widespread interest is the Monteith Library Project, descriptions of which can be found in several publications by the director of the project, Patricia Knapp.[18,19,20,21] Since this study is described in other papers, only brief mention is made of it here. The Project was undertaken with a grant received in 1960 from the Cooperative Research Branch of the United States Office of Education for "An Experiment in Coordination between the Library and the Teaching Staff to Change Student Use of the Library."

> The experiment was designed to set up a structure and procedures relating the University Library to Monteith College so that the library might contribute as fully as possible to the educational program of the college. The ultimate goal of the program is to enable students to achieve a fairly sophisticated understanding of the library and a high level of competence in its use. But the first phase of the program, that which is supported by the grant, is concerned primarily with the establishment and evaluation of a relationship planned to facilitate this achievement. The first phase--which we call "The Library Project"--might be described as "action research" in the field of institutional sociology, although the ultimate goal of the program is educational.[26]

Major features of the Project included: planned integration and motivation of library usage in curricular assignments, the nature of these assignments involving various types and levels of library usage in the different academic fields, and the provision of bibliographical assistants for the faculty members. The Project emphasizes the principle that library competence is best, if not only, attained when students use the library for their courses in the academic subjects. A primary objective centers on research relating to faculty-librarian's relations as they evolved during the Project. The analysis of the social structure in which the Project was conducted opens new avenues of research in librarianship.[27]

As already indicated, several of the titles noted above have extensive bibliographies that cite related and useful material. The Encyclopedia of Educational Research[28] constitutes still another resource. Some recent bibliographies[29,30] provide additional sources of information, some of it relevant only for their implications for library instruction and the use of library resources.

The Need for Research

The relatively small amount of research during the last decade may account in part for the small degree of change that has been made in the nature of library instruction over the years.

A detailed textbook on teaching the use of books and libraries appeared at least as early as 1911, but the actual provision for this type of instruction in the schools did not gain foothold until more than a decade later. Thirty years ago instruction in this field was widely recognized; evidence of which could be seen in the body of literature that existed on the subject, and in the objectives of education which included the development of work habits and study skills.

An analysis made by the writer of objectives stated in workbooks, manuals, and texts that were available twenty years ago on the subject of teaching the use of books and libraries reveals the following:

Objectives Relating Directly to Pupils

Instructional objectives:

To teach students how to use the library and its resources intelligently.
To instruct students in the use of library materials as aids to study.
To develop in students the reading habit.
To teach students the correct study techniques, including the use of materials, the taking of notes, and the making of bibliographies.
To teach students how to evaluate, interpret, and utilize printed materials.
To develop in the students the "library habit" so that they will continue to use libraries when they have finished school.

Social objectives:

To develop in students a sense of responsibility about the use of library property.
To develop in students proper civic and other social attitudes through reading.
To develop in students desirable habits and attitudes relating to books and libraries.

Cultural objectives:

To foster in students an appreciation of the best literature.
To develop various interests of pupils through reading.
To encourage reading as a leisure occupation.

Vocational objectives:

To provide for students who are interested, and who show an aptitude, an opportunity for prevocational training in librarianship.

Objectives Relating Directly to Library Service

To correlate the work of the library with that of other departments.
To develop the interest of pupils in the library.
To make pupils increasingly self-directive in the use of the library so that the librarian will have more time for reading guidance and for other services.

Current objectives for teaching the use of the library and its resources remain essentially the same today. A major change has come in the inclusion of objectives relating specifically to purposes to be achieved in teaching and guiding the use of audiovisual materials, although twenty years ago teaching students how to use audiovisual materials was incorporated in some programs of library instruction. The vocational objective noted above is generally not stated as such today. The last objective concerning making pupils self-directive to free the librarian's time is currently and notably absent, and the topic represented has been made more complex because of new interpretations by many librarians about the scope and nature of library services, a topic to be discussed later. The increased integration of library instruction with curricular content has resulted more in changes of method rather than in changes of specific objectives, although terminology used in some statements of objectives may reflect this shift in emphasis. It can be noted that some of the objectives reported above still represent an area in which there is no general consensus, namely the teaching of study skills.

To continue the analysis, the content of library instruction, in general, covered four major topics:

Teaching the use of the library

Teaching the use of books and other resources of the library

Teaching study and work habits

Teaching social attitudes and habits

Each of these main topics involved the acquisition of certain skills on the part of the students and the provision of certain experiences for them in using the library and its resources; these can best be shown in the following chart:

Area of instruction	Skill To Be Acquired by Student	Experience To Be Provided
The use of the library	Knowing the objectives and the functions of libraries as social agencies in the nation, community and school Knowing the objectives and services of the school library Knowing the rules and regulations of the school library Knowing the general arrangement or layout of the school library as a whole Knowing the general principles of the way books are placed on the shelves (classification and arrangement of books) Knowing the purposes of the card catalog, the ways in which it helps to locate books, and knowing how to use it	Introduction to the library Experience in using the school library and the public library Experience in finding books independently on the shelves Experience in using the card catalog Etc.

Area of instruction	Skill To Be Acquired by Student	Experience To Be Provided
	Knowing the same factors as above about the public library and its services to children and young people, and other libraries in the community Etc.	
The use of books and other resources	Knowing the parts of a book* Knowing how to use the table of contents and index in a book* Knowing how to use a dictionary Knowing how to use an encyclopedia Knowing how to use special reference books Knowing how to use periodical indexes Knowing how to evaluate books and pamphlets Knowing how to evaluate magazines** Knowing about other types of materials in the library and their uses: pictures, recordings, films, vertical file material, documents Acquiring an interest in building a personal library and knowing how and where to select books for it Etc.	Experience in using tables of contents and indexes of books Experience in using and reading library books and pamphlets Experience in knowing, using and reading magazines in the library Experience in finding answers to questions and locating information by using reference books, periodical indexes, etc. Etc.
Study and work habits	Knowing how to make a bibliography Knowing how to take notes Knowing how to outline	Experience in making bibliographies, outlines, etc. Experience in selecting, gathering together and using many materials for some specific purpose Etc.

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*Also a work and study skill.

**Many English courses included separate units on magazines and newspapers.

Area of instruction	Skill To Be Acquired by Student	Experience To Be Provided
	Knowing how to synthesize material in books and other resources for the problem at hand	
	Knowing how to locate information quickly	
	Knowing how to evaluate the usefulness and adequacy of material for the problem at hand	
	Knowing how to skim; how to read for central thought, etc.***	
	Knowing how to make footnotes	
	Etc.	
ocial attitudes and habits	Understanding and applying the principles of good citizenship in the library	Experience in applying these principles in group situations in the library
	Treating public property (books, equipment, etc.) carefully	Etc.
	Understanding the responsibilities of the individual toward the group	
	Etc.	

Again, it can be observed that not much significant change has occurred during the last twenty years. When programs of library instruction are examined that allocate the various skills and experience to the different grade levels, the similarities become more marked.

These comparisons between conditions existing in elementary and secondary schools today and many years ago have been presented in some detail to emphasize the following factors: (1) that there has been little significant change in objectives and content; (2) that most changes have taken place in methodology of instruction; (3) that instruction in the use of the library has evolved on a subjective and "practical" basis without benefit of fundamental research or inquiry; (4) that research might conceivably change objectives, content, and methodology of instruction; and (5) that recent changes in the educational process provide a fruitful climate in which to undertake inquiries in this field.

This represents only a partial listing of related reading skills, the teaching of which falls within the scope of the reading program of the school and is not restricted to the instruction of study and work methods.

Although no systematic analysis of trends in library instruction at the college level has been made by the writer, it probably can be assumed that instructional methods and content (particularly freshmen courses and orientation programs) have remained essentially the same for many years, and that the number of colleges offering such instruction has increased.

Areas for Research

Philosophic Inquiry

> With the current widespread interest in and exploration of techniques for teaching learning, the art and methods of instruction, and the psychology of learning, it can reasonably be assumed that some agreements concerning the program of teaching study skills and methods of inquiry might eventually be reached in much the same way that decisions have been made in the last decade in planning programs in numerous substantive fields of the curriculum. (Analysis of these curricular programs for implications and suggestions for study, learning, and research skills holds great value.) It is true that programs have been constructed on local and broader levels, involving librarians, teachers, and curriculum specialists, but it seems timely that a systematic study on a national basis be implemented, utilizing techniques of discussion, study, and experimentation that the various commissions or other deliberative groups in the substantive fields have employed.
>
> For the specifics of content (types of knowledge and skills) to be acquired by individual students and the decisions regarding the appropriate time, place, and methods for acquiring them can best and only be determined by the pooled judgments of experts in the academic subject fields, in curriculum construction, in instructional methods, in the psychology of learning, and in school librarianship. This is a variation, and a significant variation, of one of the proposals made at the Conference within a Conference (held during the 1963 annual convention of the American Library Association). The expectations of college specialists would also be relevant. This recommendation in no sense rules out the importance of the school librarian's participation in the planning and implementing of programs thus evolved; but instruction relating to study skills and methods of inquiry, including the use of the library and its resources, is always a means to an end, and this end and the ways to reach it must involve the philosophy and experiences of curriculum specialists and specialists in the theory of learning.[31]

Thus, one of the strongest recommendations made in this paper regarding research in library instruction involves inquiry, speculation, and contemplation rather than quantitative or systematic research. In many ways it is the most important recommendation proposed, because it is the most basic. All other proposals depend in large measure on what the judgments of the philosophers and experts might be. From them would come the basic and sound decisions, geared to the psychology of the process of learning, concerning the design or structure of library instruction: what, where (grade level and subject field), for whom, and how taught. As indicated above, analyses of the curricular programs advanced in recent years by specialists in mathematics, sciences, and other fields would also contribute, and, in addition, representatives from these programs should be represented in the deliberative body described here. A symposium extending over several days and with preliminary preparation of papers, should yield the sought after results and recommendations.

Analysis of Assignments

Analysis of curricular content as one approach to determine requisite study skills, kinds of library uses, and forms of library instruction has already been noted. To this can be added the analysis of specific assignments, a type of inquiry that can be conducted at the school building level or on broader bases. Studies of what teachers assign their students yield evidence useful for a variety of purposes: for evaluating instructional methods, for appraising the relationship of curricular content to educational objectives, for determining the extent of textbook dominated teaching, for locating questionable assignments (those that are busywork, pointless, out-of-date, dependent on rote memory or even foolish), for ascertaining the scope and variety of experiences provided for students in independent study, for calculating student work-loads, and others. They are, of course, invaluable for providing information for evaluating the adequacy of library resources.

Analyses of assignments in relation to library instruction can provide the following kinds of information: the extent to which students are motivated to use library resources, the kinds of uses of library resources that the assignments motivate, the types of knowledge and the skills that students need in order to use the library and its resources effectively in doing their assignments, and the breadth and depth of library experiences thus provided.

Within recent years, there has been an indication that, due to pressures created by the requirements for college entrance, the textbook dominated form of teaching high school students who are college potentials has reappeared. Many teachers, who are as much the victims of these pressures as the students, have returned to the use of textbooks in their concentrated efforts to achieve satisfactory college placement of students via competencies demonstrated on the well-known tests. This frequently takes the guise of the use of a small number of paperback book titles, or of selections from several works gathered together in mimeographed or other form of reproduction (with all too often scant consideration of copyright ethics involved). Systematic analyses of assignments would provide information that would support or refute these hypothetical statements.

Although the above comments pertain to elementary and secondary schools, some of them do contain implications and applicability for colleges and universities.

Methods of Instruction

When the judgments of experts plus additional insights provided by analyses of successful curricular programs and assignments provide information about what library instruction should be taught, where, and to whom, additional information will probably be required to determine the most effective methods of providing this instruction (see also Section 5 on library services).

Elementary and Secondary School

Three trends or emphases have predominated in the curricular program of library instruction: (1) a course in library instruction presented independently of other courses; (2) units of library instruction presented independently by the librarian or incorporated in major subjects; and (3) integrated library instruction. Over a period of time, the changes made in teaching the use of the library and its resources have been changes of method rather than changes of content.

Separate courses in library instruction:--The separate course consists of a series of lessons, usually presented by the school librarian, which has no connection either in organization or in subject content, with other courses in the curriculum. Several difficulties have presented themselves in connection with these independent courses. Should such a course receive academic credit? At what grade level should it be given? Who should teach it? How much time should it consume? How lasting and meaningful are the skills and techniques which students learn in these formal courses? Although the independent course can still be found in schools today, this form of library instruction is not an approved one and is disappearing.

The units of library instruction:--The units of instruction cover the same general material as does the independent course in library instruction but in less time and detail. Generally the librarian teaches these units in the library. Sometimes they are incorporated in another course, usually a major subject and frequently English, and are taught by the teacher or by the librarian. On occasion, the librarian goes into the classroom and discusses tools and techniques whenever the content of the courses necessitates their use. Classroom instruction is usually followed by some laboratory work in the library. Not infrequently the teacher teaches the unit, and the librarian directs the laboratory work in the library. A variety of practices are used in the teaching of these library units. Textbooks and workbooks are available. In comparison with the method of integrated instruction the formal unit seems less realistic and less purposive. Like the independent course it carries the connotation of isolated material or of material superimposed upon subject course content.

Integrated instruction:--Integrated library instruction means teaching students to use the library and its resources in connection with assignments for their subject courses. The technique for finding the information is essential to getting the information, and the student has the practice and experience of using the tools and resources; this form of library use is more meaningful to the student since the results are applied to a class problem and are not an end in themselves. Library instruction, instead of being a direct assignment in itself and a formal unit of instruction, becomes a method, or an instrument of learning. The formal library lesson is an artificial or arbitrary device, whereas integrated instruction is realistic. Successful integrated instruction requires the following conditions: (1) cooperation of principal, teachers, and librarians; (2) knowledge of the library's resources and of library use on the part of the teachers; (3) knowledge of the school's curriculum on the part of the librarians, and (4) systematic testing of the results of the integrated instruction. In addition, it is particularly important that a planning program be made and followed, so that it is known in what subjects and at what grade levels the elements of library instruction will be integrated in the subject matter of the course. It is important that this type of instruction be integrated in several subject-courses so that the student's use of the library and its resources can be diversified. In the school library field, research relating to and recommending integrated library instruction appeared as early as 1932.[32]

In many schools today, a combination of the second and third types is commonly found.

Kinds of research recommended for elementary and secondary schools would include inquiries that would provide evidence about (1) the relative effectiveness of the various methods of instruction--integrated lessons, separate or self-contained units of instruction, or a combination of both; (2) the use and effectiveness of programed materials in this area; (3) the use and effectiveness of closed circuit and educational television; (4) what the nature and extent of the librarians' participation in guiding study skills and work methods should be in functional programs; and (5) optimum size for large and small group instruction. The research would include control studies of various types, case studies, demonstrations, systematic observations, and normative surveys.

College and University

At the college level, recommendations for research would be affected by theoretical decisions regarding the level of competence that freshman students should have already achieved by the time they enter college. That hundreds of institutions now feel obliged to provide some form of library instruction for freshmen, ranging from orientation lessons to formal courses, seems a sad commentary on the nature of the educational programs in the lower schools and also, probably, on the adequacy of school library resources and services.

An analysis of the content of the college courses would clearly indicate whether they are appropriate for college level instruction or matters of expediency. If decisions are made to retain formal instruction in the colleges, then many of the same kinds of inquiry recommended for the lower schools would have pertinency at the college level. These comments pertain to library instruction of a relatively simple or rudimentary caliber. Agencies of higher education unquestionably have responsibilities to develop the abilities of upper classmen and graduate students to do research in their special fields and to become familiar with the bibliographic apparatus of the discipline in which they are concentrating their studies. Whether these abilities should be developed in conjunction with regular classes, seminars, and independent research or acquired in one or more courses dealing only and specifically with this content deserves exploration. This inquiry might include a normative survey of the various "literature of the field" kinds of courses now offered in colleges and universities, analyses of their content, and the location of these courses in terms of the disciplines in which they are incorporated and the college year in which students usually take them.

Tests and Measurements

Several separate tests are on the market for use in elementary and secondary schools and sections relating to library use and resources are included in tests in other areas, most commonly reading tests. Tests have also been constructed for college students.

In view of recent curricular and instructional developments in the schools, the following types of inquiry would be useful: (1) a critical examination and evaluation of available tests; (2) the identification and evaluation of locally constructed tests that are not available on the general market; (3) the construction and standardization of any needed new tests, including ones that involve actual library usage rather than conforming to the prevalent pencil-and-paper type of tests; (4) an appraisal of the values and reliability of programed materials as testing measures; (5) appraisals of the validity of scores made on library instruction tests as indicators of success in other areas of learning, either potential or actual; (6) studies of correlations between scores made on these tests and academic achievement; and (7) examination of causal factors that might affect high score performance (methods of instruction, accessibility of library resources, extent of library use, and others) and low scores (methods of instruction, poor reading skills, poor or inadequate library resources, limited library use, and similar factors). These recommendations rest upon an assumption that has never been reliably established: that tests in library instruction are the best measures for testing achievement in this area. Results emanating from the kinds of inquiries suggested in Sections 1 and 2 of this paper might show that performance in regular class assignments would furnish all the evidence needed about students' capabilities and performance in using libraries and their resources.

The Nature and Scope of Library Services In Relation to Library Instruction

The problem (many years old but more important today for policy and philosophy decisions) of determining just how much library service should be provided students in locating needed library materials might not require systematic research for its solution. Indeed, valid judgments on this critical and perplexing topic might well come from the symposium or symposia recommended in Section 1. All levels of education are affected, including colleges and universities. What distinctions are to be made between independent use of the library by students and the library services available to them in locating and assembling materials for their purposes? And when should these distinctions be made and for which students?

The mere process of locating and finding materials is not always, even seldom, an intellectual endeavor in itself. The processes brought into play when the student uses the materials--analysis, evaluation, synthesis, response, appreciation, and many others--are intellectual in nature and important. How much should students work independently in locating materials?

Which students? Under what circumstances?

If the hypothesis is accepted that the academically able and talented students need to have some command of library use and library resources (it should be recalled that discussion of the methods of instruction rested upon another hypothesis to the effect that the best way to learn library instruction is by using library materials), how much experience or independent use is necessary before diminishing returns (including wasting the students' time) set in? How can this point be determined and measured? If more services are to be furnished students, how can these best be provided in school, college, and university libraries?

These queries involve not only direct services within libraries, but also services at system or regional levels, particularly for elementary and secondary schools. Research that would lead to reliable standards for the resources and services of regional or system instructional materials centers or resource centers is very much needed today. Some preliminary planning studies have been made, but these are generally subjective and theoretical or, if employing research techniques, too fragmentary or localized in nature for general application. Some bibliographic services to teachers and indirectly to students are now being given in the Toronto school system;[33] but this program, although innovative and operative, transcending the theoretical opinions advocating more bibliographic services to students that have been advanced for several years, remains in an embryonic stage with the vast range of bibliographic services and information retrieval recommended for system or multi-system centers still to be achieved.

On the other hand, a great many services are currently being given to teachers and libraries and, indirectly, to students in the several hundred school system offices that are under the direction of school library or educational media supervisors. Although several studies have been made, mostly dealing with centralized processing procedures and costs or with other administrative and advisory services, new inquiries and experimentation directed toward bibliographic and advisory services are needed.

The long established tradition that students and scholars (evidently no matter what their age) must locate their own library resources has many staunch supporters, who question the wisdom of "spoon feeding" materials to library patrons and who weep silently at the thought of the satisfactions students will be deprived of if amplified library services become available. Even the location of materials by computers is questioned by some as being a kind of intellectually or otherwise dishonest procedure for students, authors, and scholars to follow. Nonetheless, times have changed, materials have increased in number beyond possible manipulation by most individuals (even elementary grade students), and the philosophy of methods of inquiry must be changed or reaffirmed anew. Quite conceivably, as far as most elementary and secondary schools and many colleges are concerned, the emphasis on independent use of the library has historical origins that spring from totally inadequate size of library staff, limited resources, and sub-standard expenditures for libraries, all conditions that have continued to exist in far too many situations today.

A provocative discussion of this subject can be found in the article by Schiller.[34]

The School Library As a Learning Center

Although some topics for research relating to the functions of the library as a learning center have already been suggested (i.e., how much do librarians do in guidance relating to study and learning skills and how much should they do?), the area has been isolated here as another possible framework in which investigations could be undertaken and inter-related. Accessibility, to be discussed in the next section, has a close bearing.

Possible areas for inquiry include a re-evaluation of junior and senior high school libraries as centers where all study is done (and hence the liquidation of the archaic study halls now found in most schools); formulation of standards for the size of staff, the size of library space, and other standards that would assure a transition from study halls to libraries under desirable conditions; analyses of patterns of time (both existing and recommended practices) allotted for study in students' schedules; and inquiries concerning recommended library facilities that would reflect current developments in architecture and in educational technology, including some modest inquiries concerning the optimum number of wet and dry carrels and other facilities that should be provided.

Library Use

Since use of libraries and instructional materials are covered by the topics of other papers presented at this conference, only brief attention is given here to the subject. Most of the topics isolated for discussion have some interrelationship with library instruction. In addition to the topic of use studies, the subject of accessibility of library resources has also been selected as one for recommended research because of the direct effects that accessibility, or lack of it, have on patterns of library use by students.

Accessibility

Since the best ways to learn about libraries and their materials come from using these resources and since good instructional methods today motivate students to use the library's resources (regardless of what methods are employed in locating the materials), making materials easily accessible constitutes an important factor in the total picture.

Several types of inquiry would prove useful. More exploration and demonstration is needed on the following:

1. Functional arrangements of materials in elementary and secondary schools: resource centers, learning areas, "little" libraries arranged on subject or grade level bases, and other layouts.

2. The classification and arrangement of materials in library areas, including some experimentation with intermixing audiovisual and printed materials. New insights concerning functional library plans and arrangements of materials in primary and intermediate grades are particularly needed.

3. Studies of the effects of keeping school libraries open longer hours (at night, on weekends, and during holidays), the patterns of use of libraries during these times, and recommendations for standards to meet these new demands are increasingly being asked for by administrators and librarians. The results of such studies are also needed for cooperative library planning, including evaluations of cooperative arrangements among school systems for extended school library hours.

   Some schools have introduced programs with longer hours of library service and then discontinued the practice. Why? Other schools have found that meeting standards for size of collections, making materials easily accessible in the school, and having flexible rules for circulation of materials (including reference materials) have obviated the need for longer hours. Are their conclusions based on reliable evidence? Some small school systems in densely populated areas are experimenting with keeping only one high school library open during evenings and holidays and letting students from high schools in the neighboring systems make use of this library. How satisfactory have these arrangements been? In what ways are provisions for additional resources and for administrative arrangements met?

4. Systematic exploration might provide some insights in explaining why there has been, and still remains, such a time lag between the recommendation that the school library be a comprehensive and functional materials center and the achievement of that standard. Most school libraries today are libraries of printed materials, with a good chance of having a picture file and a smattering of recordings, but with few other audiovisual materials. In several of the situations films and filmstrips are administered by the school librarian. The full realization of the concept of the school library as a true materials center has occurred on a very small scale. Attitude studies or other forms of investigations that would explain these conditions might yield illuminating inferences or implications if not proven facts. Certainly, one of the major movements ahead in the instructional materials, educational media, and library fields must involve bringing the specialists in these fields and the programs, institutions, agencies, and associations they represent into a fused and completely integrated whole. Any inquiries or assistance that would facilitate this much needed development deserve serious consideration.

5. Although there is always the possibility of being misunderstood in suggesting studies of elementary school library development in relation to services provided in childrens' departments of public libraries, it would seem feasible that a new evaluation and critical appraisal of this prickly problem be undertaken.

6. Accessibility involves duplication of titles and other materials in demand by students for their academic needs. Formulae for estimating this duplication need to be evolved. Figures relating to number of volumes and number of titles would be useful in guiding the formulation of standards for size of library collections. Since paperback books are widely used to provide sufficient duplication of titles, studies need to be made of costs of these materials as they affect standards for recommended expenditures for libraries. The question of whether it is

less expensive to give students paperbacks rather than adding and processing these materials for libraries needs exploration. (Many other avenues of research are open for inquiries about the provision and use of paperback books which have become important library resources and which are being represented on an extensive scale in many libraries.)

7. Since audiovisual materials must be easily accessible for use in libraries, librarians need guidelines regarding the types, number, and handling of the materials to be provided in libraries. Most standards have been formulated on theoretical bases; objective data are needed.

8. The nature and scope of the collection of professional materials for teachers in elementary and secondary schools and the library services required to make these materials easily accessible to teachers represent subjects where exploration, experimentation, and demonstration are needed.

9. Another pressing problem for solution pertains to the ethics of reproducing copyrighted materials and making them available to students through purchase or gift. The ethical and legal considerations involved cannot be resolved by research, to be sure, but any assistance that would hasten the formulation and adoption of a recognized code to be followed would be most welcome.

Use Studies

The use of libraries by children and young people has been reported in objective studies, but most of these investigations (many of them Master's theses or papers) are so dated that they have all but been forgotten.[35] Some works already cited in connection with library instruction also contain material about library use. (See notes, numbers 5, 7, 9, 10, 11, 12, 24, and 25.)

A major research study, one of the most comprehensive and systematic investigations in the school library field, is that by Gaver[36] on the subject of effectiveness of centralized library service in elementary schools. Mary Helen Mahar describes the scope of this study in her forward to this work:

> It supplies scientific evidence that centralized school libraries administered by professional librarians are superior in a number of educational factors to other types of provisions. Furthermore, the measures and methods developed to test (1) quality and quantity of materials, (2) accessibility of resources and services, (3) library - related activities, (4) mastery of library skills, and (5) amount and quality of reading and educational gain in schools are valuable tools for future research.[37]

Sister Peter Claver[38] tested several hypotheses relating to use of secondary school libraries and resources by 87 teachers and 2266 students in secondary schools. The investigation is an important pioneer work in that the findings for students are reported in terms of I.Q., academic rank, and reading level. Among her findings were the following: classroom instruction was largely textbook centered; less than one-half of the students used the school library each week; the students with better academic achievement and intellectual and reading abilities used the library more and used a wider variety of library resources than did other students; and students of lesser ability who used materials relied almost exclusively on the school library. Teachers made limited use of the school library.

Davis's bibliography[39] of over 400 use studies represents extensive coverage of this topic, particularly in the college, university, research, and special fields. The author states in his Introduction that he has attempted to include "all the use studies that can be found, although additional literature in the humanities and social sciences may not have been unearthed because the overall project focuses on engineering." Davis describes four categories of use studies: " . . . (1) citation analysis, which compiles citation counts to determine the use of literature in a particular field; (2) questionnaire, sent to individuals, requesting specific information as to their use of literature; (3) interview, a personal query of individuals to determine their use patterns; (4) circulation or diary study, which measures the use of materials through records kept either by a librarian or the individual himself."[40] For the 1959-1963 period he cites the following types of studies of use made of college and university libraries by students and faculty: Stack use and browsing,[41] faculty use of a large university library, [42], [43] problems of use in university research libraries,[44] faculty appraisal of a university library,[45] and use of materials in university medical,[46] biology,[47] and mathematics and physics[48] libraries.

Within the last five years there has been renewed interest in the perennial question of the use made by students of libraries (generally public libraries) outside their own school, college, or university. Many of the inquiries concentrate on getting opinions from librarians about the problems created by student use of public libraries, without too much detail concerning the characteristics of the users, the nature of the use made by them of libraries, and the resources used. Studies receiving the most attention include: Haas's study[49] of the use made of New York public libraries by a sample of students in New York colleges; the report of a survey assessing the availability and accessibility of resources to meet student needs by Schick and others[50] and Martin's investigation51 of students and their use of the Pratt Library.

Bonk's inquiry[52] into the usefulness of 352 basic reference titles involved a large sample of librarians doing reference work in college, university, high school, and public libraries. Power[53] in a preliminary report states that "there have been approximately 75 studies of scientists' use of the literature over the past 20 years. A direct correlation has been found between the scientists' formal education in library methods and his use of the literature."[54] She recommends the inclusion of library instruction in the curriculum of science departments and instructions of technology.

The kinds of use studies that would yield pertinent data in solving some of the queries already raised in this paper can be grouped as follows: (1) studies of general patterns of use that would answer such questions as: What are students using in the way of materials? For what purposes? What are the characteristics of these students -- academic achievement, reading abilities, intelligence level, backgrounds, and other factors? Where do they obtain the materials they use, both for academic and non-academic purposes? Why do they obtain them where they do? What questions do they ask of librarians in seeking information or for other objectives? For what reasons do students use or not use different media?; (2) studies of the relative effectiveness of different media used by students for both academic and non-academic purposes; (3) critiques, supported by evidence, that would directly confront the problem of the imminence of the return to and supremacy of textbook dominated teaching as a result of the pressures, images, symbols, and attitudes created by the examinations that determine selection of students for colleges and universities; (4) studies of the use made by students of specific tools (indexes, reference works, the card catalog, etcetera)* that would inquire into the extent and nature of the use of these tools, methods followed in using them, difficulties encountered, related problems, and implications (such as the relevance of existing subject headings and classification schemes most commonly found in elementary schools); (5) comparative studies that would test the relative effectiveness of those classification schemes that have departed from traditional forms in relation to long established schems; and (6) experimentations with new subject headings for students in elementary and secondary schools.

Many of the studies proposed above would perhaps have most usefulness for elementary and secondary schools, but more inquiries concerning the nature of library use in colleges and universities are needed today and would fall in several of the categories noted.

Clusters of studies that analyze use patterns in different localities and that employ the same research methodology, provide more fruitful results than isolated studies. Only when we have collected a reliable body of evidence about the nature and use of libraries of all types, can we make sound and valid plans for regional cooperative library services and research centers.

The total area of studies dealing with the use of library resources and services embraces many more facets than those enumerated, and, although all such studies could conceivably and even probably have meaning for library instruction, they are not cited here. Examples of a few of those areas include the way students read and interpret both text and illustrations, methods for explaining concepts and developing experience backgrounds, the influences of format, and so on. The numerous citation studies that have been done in connection with research in college and universities could have some bearing on library instruction and usage of materials

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*Several studies of the use of card catalogs by students have been made, particularly in connection with college and university students. These studies have made use of diary techniques, observation, and other methods. Although most of them are out of date, some feeling seems to exist that a battery of new studies is not particularly needed at the higher institution level. The emergence of the printed book catalog may reopen the desirability for new research along these lines.

Concluding Statement

Some developments, problems, and research, both completed and needed, have been noted in this paper. The focus has been on library instruction, with additional comments on accessibility and use of library resources and services as they directly or indirectly affect the central theme. Formal research is butone part in an overall structure to be built, and these other parts, most of which have been stated or implied in this presentation, have their own intrinsic value in being considered among recommendations for development and support. They can be summarized as follows:

1. The development of a body of knowledge that represents sound theory and philosophy, with particular reference to having symposia that would advance such knowledge by creating opportunities for specialists in many disciplines to exchange ideas and to pursue critical explorations that are essentially contemplative in nature.

2. The furtherance of systematic research and investigations.

3. The promotion of experimentation of an action research nature in schools and elsewhere involving library instruction and library use.

4. The implementation of demonstration projects of outstanding programs in libraries that would be accessible for visits by librarians, teachers, and others; and the implementation of demonstrations of effective uses of materials of all types and involving different age groups (these could also be undertaken in the regional and local materials centers).

5. The initiation and continuation of a series of service studies that would synthesize and evaluate ongoing developments and activities, the findings of research and other reports, and materials published or produced in the field.

6. The establishment of bibliographic apparatus and information control in the field so that there can be effective communication among those working in the area and so that there can be effective transmission of information, not only to make information available but to prevent unnecessary duplication of effort.

7. The establishment of a network of regional materials centers where staffs of specialists would construct systems or other techniques for the analyses of materials (especially needed for materials appropriate for children and young adults); where the content of materials would be computer stored, and the retrieval of such information would be made available to teachers, librarians, students (as needed), and others.

8. The formulation of blueprints for the organization and services of local instructional materials centers and for the relationship of these agencies to the regional centers.

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THE USE OF TRADE BOOKS, CHILDREN'S BOOKS, AND PAPERBOUNDS AS INSTRUCTIONAL MEDIA

by

Dan Lacy

Whether measured in terms of expenditure of funds or of student-hours invested, by far the largest-scale recent development in new uses of educational media has been the increased use in schools and colleges of books not written or published primarily for instructional purposes--that is, of general books as distinguished from textbooks. Though printed books have been used in schools for more than five centuries, the scale and kinds of use developed over the last decade is a truly novel development--an innovation at least as "new" and of a much more sweeping scope than the introduction of audiovisual and broadcast media.

This new and greatly expanded use has come about as a result of (1) a great increase in the number and quality of school libraries; and (2) the availability of inexpensive paperbound editions of about 35,000 titles, most of them relevant to school or college use. There is, of course, an enormous literature on school and college libraries and a considerable literature on the use of paperbound books in the schools. It would be pointless to attempt to itemize this literature here. It should be pointed out, however, that most of it is descriptive or hortatory; little indeed represents the reporting of true research, especially research intended to discover the effect on the efficiency of learning of the extensive use of "general" books.

This is not surprising. Such research is difficult to design or execute, since it is almost impossible to isolate the extensive use of supplementary books as the variable in an otherwise fixed situation so that its presumed effect can be measured. Almost always it is the abler and more enthusiastic teacher who employs books in this way and it is impossible to separate the results of the teacher's ability and enthusiasm from the results of the use of books to which his enthusiasm leads him. Nor has such research been thought necessary to attest the value of an extensive use of general books in teaching. Wide general reading is almost universally regarded as one of the basic ends, as well as a means, of education and hence desirable in itself quite apart from its contribution to the efficiency of teaching.

Indeed, as the indispensability of a lifetime of continuing self-education and cultural experience has become clear, and as educators have increasingly viewed their responsibility as one of fostering the interests and skills essential to this post-school process, the importance of general reading has been doubly emphasized. When they have completed their formal education, adults will rarely afterward be able to rely on textbooks, training films, or similar devices to continue their intellectual and cultural growth. Their continued learning after school will depend primarily on their skill and interest in reading newspapers and magazines and especially the whole range of books of the adult world. Hence the use of such materials in the school has a special and unique value apart from its immediate contribution to learning. It is not merely a question of whether extensive reading helps a student to a better and quicker command of a particular curriculum unit, but whether it helps him in the development of a lifetime reading and learning habit.

For all of these reasons, the relative absence of research designed to verify and to measure the effectiveness of general books as an educational medium is probably well founded; and no large research program addressed to this particular object is believed to be needed.

There are, however, a number of rather urgent research needs in other aspects of the use of general books. Three areas in which research is needed are specially apparent:

1. Practical obstacles to the wider use of general books as educational media.

2. The psychology of reading motivation and its relation to the use of general books.

3. Methods of using other media, especially broadcast media, to stimulate general reading.

Practical Obstacles

These include legislation and administrative regulations; purchasing practices; lack of opportunities for informed book selection, inadequate sources of supply, inadequate correlation between schools and public libraries, and censorship pressures, among others. Some typical kinds of research projects needed in this area include:

A. A study of legal and administration barriers to the purchase and provision to students of paperbound books. In many school systems textbook purchase funds can be used only for purchases of hardcover books that will remain in use for several years and that are identical for each member of the class. Since it would often be very desirable for students not only to have paperbound books, but also to have individual choices among a varied selection, it would be useful to study the governing laws and regulations in an extensive sample of school systems on this point, and in particular to identify those that permit a free and flexible use of paperbound books.

B. Similarly, purchasing practices of many school districts are adapted to textbooks and routine educational supplies that are generally available. Requirements of competitive bidding for the purchase of library books and paperbounds, when not coupled with vigorous tests of the competence of bidders, often place the orders in the hands of under-capitalized or incompetent jobbers who render very poor service with resultant delays and increases in costs. Badly needed is a comparative study of purchasing practices and resulting services that will provide the basis for a model set of purchasing regulations, including a standard set of qualifications for eligible bidders in terms of stock, capital, and experience.

C. The problem of book selection, for school libraries and for school use of paperbounds, is a serious one. In the case of textbook purchases, very large expenditures are involved for a relatively limited number of competing titles, which if selected may be purchased in hundreds or many thousands of copies. There is also usually a clearly defined mechanism for textbook selection. Hence publishers can afford to see that the selection authorities have ample opportunity to examine and compare textbooks. This is by no means the situation with respect to library books and paperbounds. Here limited sums are available to purchase from among tens of thousands of competing titles, and in the case of library books usually in single, or at most a very few, copies only. No publisher can afford to make his offerings known to and available for examination by the innumerable thousands of teachers, librarians, supervisors, principals and others involved in school library book selection. And because the extremely varied, not to say confused, practices of book selection are not adequately known, much of the limited promotion money available to publishers is ineffectively spent. Research is needed which will:

1. Identify and describe the varying practices of school library book selection: e.g., the relative role of teachers and librarians, state participation through lists, etc.

2. Identify sources of information used by those actually making selections, differentiated by grade level and subject: lists (which ones?), reviews (in what journals?), exhibits (where?), publishers' catalogs, promotions, salesmen (which?).

3. Establish the need, if any, for additional reviewing and bibliographical services addressed specifically to the needs of school libraries.

4. Determine and evaluate the opportunities for teachers and librarians to examine and become familiar with new general books and paperbounds, and identify needs for examination centers to be established by state or metropolitan school systems or teachers' colleges.

D. The use of general books in the schools is by no means confined to those made available through school channels. At the high school and especially the college level, students buy their own books, sometimes from school and college stores but often from general bookstores. And in enormous and growing numbers they use the resources of public libraries, near their homes, usually better stocked, and open nights and weekends. This has produced a sometimes insupportable burden for public libraries, and has raised difficult problems of cooperation. These problems will be much more severe in the next several years, especially at the college level, as a high proportion of the anticipated several-million increase in college enrollments will be in urban institutions at which the students live at home. Many of these will be new or suddenly expanded institutions with inadequate library resources. The library demands of this college generation will of course be much greater than those of high school students.

Research is needed to determine the present patterns and trends of school and college use of public libraries; to identify and report excellent practices of cooperation that have been developed; to identify and report steps to provide special financial assistance to public libraries to meet this demand; and to identify need for such support.

E. Since the introduction of general adult books into the high school curriculum through the library or the use of paperbounds is the school's first introduction of the adolescent student to reading matter not written or selected and edited for the use of children and adolescents, sensitive questions arise. There are often intense community or parent or organization pressures to avoid the use of specified books, even though they may be very apt for the school's purposes. Frequent clashes over this issue are reported and known. But one may surmise that for every clash that happens, a hundred may have been avoided by the discreet omission of potentially controversial books. If so this may be seriously damaging to the educational process. In general, it is probable that fear of censorship is a major factor limiting the wider and more effective use of general books in the curriculum.

Research in the school field is badly needed, analogous to Fiske's study of California public libraries, to determine not so much how many censorship fights occur, but rather by what practices of suppression or omission they are avoided and how great the impact of these fears and practices is on school library and paperbound book selection and use.

Psychology of Reading Motivation And Its Relation to the Use of General Books in the Schools

The limited number of studies of the development of lifetime reading habits (as distinguished from the development of reading skills) suggests that these habits, good or bad, are likely to be fixed in adolescence. Their formation seems to be related to the fact that in junior high school or lower high school students outgrow the books, both general books and textbooks, written for children, and may or may not successfully enter the new world of adult reading. This transition is, of course, made more difficult by the fact that it must take place at a period when there are other new and heavy demands--academic, athletic, and social, on the student's time.

It is also, and especially, complicated by the fact that the student's need to form his relation to adult reading comes at a rebellious and difficult time for him, when he is struggling to redefine his relationship to adult society generally, breaking away from his dependent status in that society as a preparation for reentering as a peer. Reading has a dual relationship to this process. Though, for boys at least, to read even "good" books regularly may bring adult disapproval from some sources ("bookworm," "sissy," "greasy grind"), it is generally true that reading--at least of the right books--is a means to adult approval, both at home and at school. This is a powerful motive for pre-adolescent children. But reading is also a means of rebelling against society and asserting an independent and critical judgment of its mores--sexual, political, racial, religious, and economic. As such, it is one of the youth's own instruments for asserting his individual position against the establishment.

Adults have responded to this dual function of reading with an ambivalent attitude. "Reading" is encouraged, yes; but not reading of comic books, in an earlier day of "dime novels," of Playboy or James Baldwin or George Orwell or Camus, or J. D. Salinger, or D. H. Lawrence. A pervading fear of infection by reading--in matters of sex or religion or race or politics--runs through many adult attitudes, in home and church and library and school.

Yet clearly it is this autonomous reading, self-directed toward one's own ends of self-realization, that--proceeding from whatever crude beginnings --forms the basis of any enduring reading habit. Reading done to win favor with teacher or parent will cease when that is no longer a goal. A young man or woman will continue to read only if he has come to think of reading as one of his resources to achieve his purposes.

Access to a wide range of general reading is obviously central to the solution of this problem. Formal teaching materials--textual or audiovisual --are by definition prescribed. The student can express himself only by the act of choice--and adequately only if the range of choice includes means of rebelling as well as of conforming.

The foregoing hypothesis as to the dual roles of reading and their relation to the formation of lifetime reading habits is believed to warrant serious research by experts in adolescent psychology in order to verify its assumptions and to formulate a strategy for the development of lifetime reading habits based on the insights derived from such research.

Methods of Using Other Media In Reading Promotion

Both educational and, to some extent commercial, broadcasters produce programs intended to promote reading, with widely varying success, insofar as it can be measured. Other broadcast programs, though not having the promotion of reading as an objective, in fact often have that result. The hypothesis may be offered that programs about books attract only already interested readers and do little to extend reading habits, and that the interest of those who read little is better caught by programs about ideas or places or people or things that stimulate their curiosity and about which they can learn more by reading. That is, it is probable that people are led to books and magazines not by programs about those publications, but by programs about the things and ideas reported in them.

But again we need to verify this hypothesis by research. We also need to undertake a review of programs that have been undertaken to determine the characteristics of those that have, in practice, proved most successful. Study of the experience of programs that couple discussion ideas or places or social problems or other topics with reference to sources of further information, and that are coordinated with school and library programs would be particularly relevant. We need to form criteria that will guide further investment of funds and energy in this promising area of intermediate collaboration.

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IMPLICATIONS OF CURRICULUM TRENDS, METHODOLOGY, AND CONTENT FOR EDUCATIONAL PUBLISHING

By

Austin J. McCaffrey

A major objective of most of the world leaders of today is the improvement of their educational system. The state of development of a particular country will, of course, determine the needs of the schools and the appropriate steps to be taken. In some cases, universal literacy training is of prime importance. Other countries need to expand their higher educational facilities. The challenge which America faces is to provide equal access to education and training for all citizens so that they may realize their full human potential.

The age in which we live does not make the accomplishment of our objectives an easy one. The number of students alone is enormous. In the Fall of 1965 there were 54 million students enrolled at all levels of education. The population is continuing to expand at an accelerating rate. The U.S. Office of Education predicts total enrollments of 62 million by 1973. The human race is doubling every 35 years. It is expected that by the year 2000, the world population, now about 3.3 billion, will be about 6 billion. The size of the establishment needed to educate the increased number of pupils must grow to keep pace with the demand.

Another problem which we must face is a technological society in which 2 million jobs a year are being affected by automation--and only 5 per cent of all jobs in the United States remain unskilled. Recent government statistics show that a young man of 20 can look forward to between 6 and 7 separate job changes during his working life under the impact of automation and technological change.

According to Seymour Wolfbein, Deputy Manpower Administrator, U.S. Department of Labor, 40 per cent of all the people we count as unemployed never went beyond grade school; two-thirds never got a high school diploma. The unskilled worker has an unemployment rate double the national average. While 10 per cent of the labor force is Negro, 20 per cent of the unemployed is Negro.

Not only does lack of required educational attainment represent a prime common denominator among the unemployed; it is also a prime suspect in the apparent social and economic hereditary nature of our jobless and poverty problem. One study reveals that in the most literate countries, the average man seems to be earning approximately 15 times as much per year as does the average man in the least literate group. This is a reasonably clear indication that education even at its most basic level--that involving simple literacy--tends to produce astonishing results.

Another force which is influencing education today is the interest and concern of the Federal Government that each individual citizen has the opportunity to acquire knowledge.

President Johnson's legislative program places great emphasis on education. Federal funds will be available for a wide range of new programs, including:

A new program will offer instruction for preschool-age children of the poor; children in poor neighborhoods will be able to get textbooks bought with federal funds. Federal aid is provided to help localities in paying salaries of teachers and in meeting other expenses, with subsidies based on the number of children from poor families. Money from Washington will be used to train teachers in teaching remedial reading and in other fields involving handicapped children. Community centers will be set up, financed with federal funds, to give students special instruction that they might not get from established public and private schools. Teacher fellowships will be available to those who want to take advanced training. Colleges and universities for the first time are to receive grants to train librarians. There are to be federal scholarships for youths from low-income families; more liberal federally backed loans for other students; work-study programs are set up to help financially strapped students go to college. Help will be given for construction of college classrooms, laboratories and libraries.

Educational research centers are to be established to explore new ideas for schooling. The Research and Development Center for Learning and Re-Education at the University of Wisconsin is one of four already established. It is concerned primarily with concept learning and problem-solving in the various school subjects. Activities of the Center include basic and applied research, development of models and theories, production of instructional materials, field testing of materials and procedures, and widespread dissemination. The primary purpose of the Center is to improve the efficiency of learning by normally developing children and youth in the schools. Problems of concept learning and problem-solving in the re-education of adults and of culturally deprived children are studied also. Further, motivation and other conditions essential to efficient learning are investigated.

The initial staff of the interdisciplinary center is comprised of scholars and assistants, mainly from three areas--the behavioral sciences, the academic disciplines, and communications. In the establishment of the Center, the University of Wisconsin pledged itself fully to investigate problems of learning and to disseminate research findings in a way that will bring about improvement in school practices.

At the state level, concern for the improvement of education is evidenced by the "Compact for Education" adopted by a group of state political and educational leaders from every state.

The Compact, when ratified by at least ten states, will establish an Educational Commission of the States, which will have the authority to:

1. Collect, correlate, analyze and interpret information and data concerning educational needs and resources.

2. Encourage and foster research in all aspects of education, but with special reference to the desirable scope of instruction, organization, administration, and instructional methods and standards employed or suitable for employment in public educational systems.

3. Develop proposals for adequate financing of education as a whole and at each of its many levels.

4. Conduct or participate in research of the types referred to in this article in any instance where the Commission finds that such research is necessary for the advancement of the purposes and policies of this Compact, utilizing fully the resources of national associations, regional compact organizations for higher education, and other agencies and institutions, both public and private.

5. Formulate suggested policies and plans for the improvement of public education as a whole, or for any segment thereof, and make recommendations with respect thereto available to the appropriate governmental units, agencies and public officials.

Because of all the attention being centered on our educational system, American schools are experiencing their own revolution, with new ideas and techniques being introduced into the classrooms in an attempt to broaden and improve the quality of instruction. Some of the developments which have affected school practices are: (1) national curriculum studies; (2) new methodology; and (3) new technology.

In the late 1950's funds became available through the National Science Foundation and the National Defense Education Act for research and development of new programs and materials. Using these funds, teams of educators, teachers, scholars, and occasionally psychologists, began to develop new programs, first for secondary schools, then for elementary schools. A variety of new mathematics and science projects have resulted. Two major changes characterize most of the current programs. One is the change in the subject matter content to place emphasis upon the structure of the subject. The other is in the change in methodology to place an emphasis on learning processes.

Dr. Lawrence F. Lowery of the University of California describes the learning of a structure as a growing experience for the child. For example, in the Animal Coloration unit developed by the Elementary School Science Project at the University of California, a child, by observing, may see why a fish is colored in a certain manner for protection. Through other experiences in the unit, the basic concepts of animal camouflage are broadened as he relates them to other animals. The same concepts are deepened as he again relates them to the other concepts he has been learning, the blend of which form the theory of natural selection. Thus, in many of the new projects, structure is presented as something to be built upon in order to broaden and deepen one's understanding.

The second major curriculum change has been to develop and integrate into the new programs techniques which utilize problem-solving, inquiry and discovery. Basically, the problem-solving technique leads a learner to organize and record what he encounters in a systematic way that will help him realize similarities and patterns. The inquiry technique has its base in rational thinking, but provides with it a freedom for each student to develop his own strategy for gathering information. The discovery technique utilizes either the set patterns of the problem-solving technique or the freedom of the inquiry technique to gather knowledge. The essential difference is that the discovery technique places an emphasis on the satisfaction of finding solutions to a problem.

Revisions in mathematics and science curriculum programs have had an impact on schools throughout the country. The National Science Foundation, alone, during the nine years of its existence, has obligated $69 million for course content improvement projects. The Association for Supervision and Curriculum Development reports 32 current mathematics projects. One development is the Cambridge Conference on School Mathematics. This group, associated particularly with Massachusetts Institute of Technology and Harvard University, but with wide membership, has set itself the unique task of trying to plan for the next 30 years of evolution in the mathematics curriculum. Several trends to be noted in the new curriculum materials are: increasing efforts to combine mathematics and science, or at least to relate the two; a more prominent role for mathematical logic in a pre-college mathematics, beginning even as early as grades 5 and 6; and a greater diversity of kinds of learning experiences, especially the inclusion of physical experiments as part of the study of mathematics.

The science curriculum has also, as you all know, been undergoing reevaluation. It is believed that there may be several alternative, perhaps equally effective, science curriculum organizations. Groups have been encouraged to develop curricula from different approaches, either as to content organization, selection of topics or proposed methodology. Studies vary from emphasis on the processes of science to emphasis on concepts of science. The units or topics being currently prepared for the elementary school reveal interesting and novel new approaches to the study of the environment.

The Commission on English was appointed by the College Entrance Examination Board in September 1959. Broadly stated, the Commission's purpose was to improve the teaching of English in America's schools and colleges. It sought to encourage and facilitate a gradual nationwide improvement in curriculum, teacher training, and the methods of classroom instruction. Its stated goal was to propose standards of achievement for college preparatory students and to suggest ways of meeting them. For five years the members of the Commission talked and worked with English teachers in all parts of the country. In their report, issued this year, they offered a series of recommendations on professional standards, teaching conditions and curriculum which they considered a reasonable minimum for sound, vigorous teaching of secondary school English.

The number of social studies projects has doubled in the past two years, involving activities ranging from the production of teaching guides to the development of a complete program of instruction for all grades. The dominant objectives as set forth in current projects attempt to develop an understanding of key concepts, generalizations and themes and the ability to use them as hypotheses to guide study and as centers around which information can be organized; to develop those attitudes, skills and modes of inquiry that are characteristic of disciplined study and are most useful in lifelong learning; and to develop competent citizenship through a solid grounding in the social sciences. Increasing attention is being given to the production of materials to place in the hands of students in addition to the preparation of teaching guides. Materials are currently available for elementary students in economics and for secondary school students in foreign affairs, anthropology, world history, political science, problems of American democracy and American history. Multi-media approaches are stressed with specific attention to films, recordings, readings, transparencies, slides, pictures and filmstrips.

In the area of teaching methodology, one of the widest known of the innovations is team teaching. The emphasis on individual instruction to account for the varying ability levels of students has made the concept of team teaching important to the schools. Team teaching departs in two essential ways from the ordinary organization of an elementary school. First, no single teacher is responsible for all the instruction that a class receives. Second, class size is not fixed, but varies with the activity.

The non-graded school has become another instrument to introduce flexibility into the schools. Already 18 per cent of the elementary schools in the United States have instituted a non-graded system. It has many variations. In a great many schools it is used only in grades one, two, and three. Others have reorganized the entire school. Often, reading achievement is the keystone for the grouping although a few schools have worked out the grouping for every skill subject.

Other methods for encouraging individual learning and adapting to the needs of different rates of achievement are the Advanced Placement Program; the lengthened school day and school year; the de-emphasizing of fixed subject matter.

Technological devices are also having an influence on classroom instruction. For example, in the public school, college and university school systems of the United States, there are now approaching 900 closed-circuit television systems which regularly contribute to the instruction of an estimated 7 million students.

The Midwest Program on Airborne Television Instruction (MPATI), now in its fifth year of operation, can probably reach more schools and students than any other broadcasting technique like it. Operating on two UHF channels, MPATI transmits 26 courses from airplanes that circle over the Purdue University area at Lafayette, Indiana. Lessons are telecast 4 days a week, 5 hours and 10 minutes each day. Most lessons are repeated to allow schools flexibility in scheduling. Course guides are provided for the benefit of teachers and pupils. MPATI covers more than 140,000 square miles containing 14,000 schools and colleges that enroll 6.6 million students.

In South Carolina this Fall, approximately 100,000 students will receive educational television instruction. Twenty-eight subjects are taught by ETV, including mathematics, history, chemistry, physical science, French, driver education, and electronics.

The number of language laboratories in the secondary schools has grown from a few dozen in 1959 to well over 6,000 as of January 1964, and represents an outlay of approximately 30 million dollars. Some of the various formats in which the concept is used are: (1) the formal lab with enclosed booths for students and control console for the instructor or lab assistant; (2) the perimeter lab which utilizes booths or stations placed around some of the walls of a classroom to enable the teacher to use the total space for different purposes; and (3) the convertible laboratory employs student stations that fold up for use as a lab and fold down to permit the facilities to be used as a classroom. It has become apparent that the advantages of the laboratory are equally effective in other areas of learning such as speech correction, music appreciation, arithmetic drill and vocabulary acquisition.

Other classroom aids include films, kinescopes, filmstrips, flat pictures, models, mock-ups, records, audio tapes, programmed instructional materials, slides, overhead transparencies and videotapes.

Historically, publishers have maintained close contact with educators so that they would be able to produce materials to suit the market. However, in this age of rapid change and accumulation of knowledge, it is no longer possible to wait until the need arises--it must be anticipated. As a result, the American Textbook Publishers Institute has undertaken to work out cooperative arrangements with various educational agencies, either through conferences, liaison committees or individual meetings in the hope that publishers can contribute to the formulation of solutions for the problems and be able to build instructional materials which complement the new programs.

The Institute has sponsored several conferences in cooperation with interested educational organizations in order to discuss the needs for instructional materials which complement the developing trends. In December 1964, the Institute devoted a conference to "Implications of Research, Development and Experimentation in American Education." At this meeting papers were presented which covered many aspects of education from the changing mission of the schools to curricular materials for the new-type schools and implications for development, distribution and use of materials. One speaker suggested that a child should be able to read about, listen to, see pictures of, hold in his hands, watch performed, and, of course, act out himself the things to be learned. Another recommended programs and materials designed to equip the individual for a never ending process of learning.

Another significant conference sponsored by the Institute in cooperation with the United States Office of Education considered "Developing Programs and Instructional Materials for Adult Basic Education and Job Skill Training." This was an exploratory conference to examine possible avenues of cooperation between the various agencies involved in adult basic education. During the conference, separate panel discussions centered on: existing instructional materials; instructional programs in manpower development training; meeting the educational needs of the school dropout; and selecting and improving the content of instructional materials for the undereducated.

In 1963 the U.S. National Commission for UNESCO, in cooperation with the National Council for the Social Studies and the Institute sponsored a meeting for textbook publishers and writers on the teaching of non-Western studies--how it should be done, what materials are available, and what objectives are to be achieved.

The Institute has jointly sponsored conferences with the American Book Publishers Council when the subject matter affected the entire industry --such as a meeting with the National Council of Teachers of English. We have held cooperative meetings with the National Urban League and other organizations interested in upgrading the educational system. In the exchange of ideas generated at these meetings, both educators and publishers gain new perspectives on the other's problems and are able to design programs and materials best suited to the needs of the pupil.

Just this month, the Institute participated in a Harvard Seminar on Industry and Education. The purpose of the Conference was to explore the new relationships which will be required between the scholars, the publishing industry and the schools if we are to provide the highest possible quality education for our children.

The Institute also maintains liaison committees with leading educational organizations. One such committee is the liaison committee with the Research Council of the Great Cities Program for School Improvement. This committee was originally established to discuss the special text and non-text materials needed in the large cities. One result of the meetings was the publication of a booklet, "Illustrative Guidelines for Selection of Content of Instructional Materials Designed to Meet the Needs of Urban Youth." The suggestions cover social studies materials and communication skills materials, from kindergarten through grade 12, and are listed in a progressive order on the basis of increasing pupil maturity.

In November 1964, a series of recommended joint activities proposed by the Institute was accepted by the Great Cities Research Council. One of these recommendations was the establishment of a central library for urban-oriented instructional materials. This project has been undertaken by the Educational Materials Center at the U.S. Office of Education in Washington. Already, a good many materials are available for educators to study.

Another recommended joint activity was a conference which was held in Los Angeles, November 10th to November 12th, 1965. This conference dealt with the learner, the teacher and the instructional materials and suggested ways in which educators and publishers could cooperate to develop instructional programs for the urban schools.

Research being done by the Great Cities into the peculiar needs of the urban schools has been very helpful to publishers in developing new materials. Task forces of publishers representing the Institute have thus far visited the Detroit Public Schools, the New York City Schools and the Los Angeles City Schools. The exchange of ideas and information in these meetings has been invaluable. For example, in Detroit one teacher surveyed 167 elementary and secondary teachers and compiled their suggestions for future texts for disadvantaged youth.

The Institute also maintains a Joint Committee with the National Education Association. In this way, there is a continuing flow of information between the teacher and the publisher. The most recent project of the committee is a study paper, "A Time For Questioning." This was designed to stimulate discussion among private community organizations about the needs of the schools and the responsibility of the citizens. The committee also plans to undertake a study of how textbooks are being used in the schools; how they are purchased; by whom and how often. School Management Magazine, 22 West Putnam Avenue, Greenwich, Connecticut, with the cooperation of the Institute, is making a preliminary survey in this area which will be published in their March 1966 issue. It was felt that by determining the average standards used by the schools nationally, the local personnel will have something to measure their practices against.

Meetings have been held with numerous educational groups to discuss current and future trends in instructional materials. Institute representatives have met with departments in the U.S. Office of Education; with divisions of the National Education Association; with State Departments of Education; with the National Science Foundation and particular curriculum study groups; B'nai B'rith; and many other organizations, both public and private.

Educational publishers have not been content merely to keep current with the tremendous changes taking place in the schools. Recognizing the need for new kinds of materials in order to meet the challenges posed by world events, publishers have acted in several ways.

Until the mid-century, many of the textbook houses were small, family-owned businesses. When it became apparent in the late 1950's that the instructional tools being contemplated for future classrooms would require large amounts of capital for their development, some of the companies offered themselves for public ownership. In other cases, firms merged with other publishers or with allied organizations. Another group devoted its efforts to specializing in a particular area of the market. These events made it possible to obtain the necessary financing to develop and produce a broad range of educational programs and projects for the schools.

The new groupings have made it possible for some firms to expand their operations into additional levels of education such as an ELHI publisher now also producing college books. More money has also made it possible for publishing houses to increase their research staffs dramatically. Publishers are employing large numbers of the scholars involved in the national curriculum studies to develop separate text materials for the schools which embody the new subject matter approaches. In addition, textbook publishers employ many more professional educators whose knowledge of the schools and the curriculum is valuable in designing new products.

Recognizing that teachers are unfamiliar with some of the new materials, publishers conduct seminars and workshops for school personnel in order to explain the possible uses of recently introduced instructional materials and also work with administrators in helping them to integrate into their classrooms innovations which are most appropriate to their school situation.

Increased use by the publishers of book clubs to encourage reading and the establishment of book stores in local high schools and elementary schools have stimulated the student's desire for knowledge. Publishers have also entered into agreements with other publishers to merchandise their books. For example, one publisher sells to the schools a package of materials which includes books of several publishers in addition to his own.

Another practice which is being increasingly emphasized is the careful testing of new products to determine their effectiveness before they are made available to the school market.

New consumers of educational materials are continually being added. The pre-kindergarten children enrolled in an Operation Head Start project are one example. Beginning as a preschool, summer session, Operation Head Start has now been extended to a year-long project and many valuable educational experiments are being conducted at these community centers. Approximately 40 operational evaluations of Project Head Start 1965 have been contracted for by their office of research and evaluation. Some of the evaluations will cover only one aspect of the projects, or one particular project, while others will be comprehensive area or national studies. The results should be useful in directing future materials and programs.

The adults being educated in communications skills and mathematics through Title II-B of the Economic Opportunity Act create another market. The supplementary educational centers authorized by Title III of the Elementary and Secondary Education Act provide a number of additional educational experiences.

Since the colonial days when the Horn Book and the "blue-back" Speller were the instructional tools to give students moral and social values, producers of educational materials have attempted to keep pace with developments in education. In today's rapidly changing world, the demands on the schools and the students are overwhelming. The instructional materials must also meet new standards of excellence.

Research studies on textbooks and other printed materials have included analysis of content, such as language arts, social studies, mathematics and science; and other aspects such as readability, typography, and illustration and design. Studies on the use of paperback books in the schools have been conducted by the states of Texas and New Jersey, and by New York City.

Revisions in the traditional concept of the textbook are appearing daily. While the school book will, it seems to me, remain the basic tool for transmitting accumulated knowledge from one generation to another, its form may be radically different.

Programmed texts are one example of the changed format. The idea of programmed instruction in order to allow a pupil to proceed at his own rate of speed through a particular course of study has become widely accepted in schools dedicated to individualized instruction. Subjects can be taught by this method either by machine or by printed materials. Publishers are providing materials for both. Programmed textbooks are appearing in such diverse subjects as arithmetic, American history and English literature.

Other publishers are entering into new areas in the social studies, reflecting the increasing plurality of our society. Textbooks which emphasize the contributions of the Negro to the development of America are being published by all major firms. One company is publishing a series of biographies of local Negroes who have achieved a position in society and professional status.

The newly developed countries of Asia and Africa are now being covered in the curriculum. Firms are hiring local authors to write the books about their native lands.

In order to compensate for individual differences, publishers are producing multilevel texts. A reading laboratory series is being offered which consists of boxed sets of multilevel reading materials that allow students of varying reading ability in the same classroom to begin, each at his own proficiency level, and to progress as fast and as far as his individual capabilities will allow. Another company is producing a history textbook in four individual units for easier student use.

The revised curriculum in mathematics meant an entirely new series of arithmetic books. Similarly, the physics, biology, earth sciences and chemistry curriculum studies require completely new books. In some cases, one publisher has been given the contract to publish. In others, several firms have hired the authors of the studies to develop separate interpretations from which the schools may select.

Materials are available for the adult illiterate and the preschool child; for the slow learner and the gifted student; for teaching English as a second language and teaching a foreign language in the primary grades. This is only the beginning of the variations which will be issued in the coming years.

The incredible rate at which knowledge is accumulating makes it an almost impossible task to keep textbooks for certain subject matter current. One publisher accompanies his economics textbook with a weekly news digest which discusses current events which are related to specific chapters of the book.

Another method of keeping classroom knowledge up to date is the use of supplementary reading materials. The use of auxiliary readings to enrich and broaden a student's exploration of a particular area of learning has received impetus from the increased acceptance of paperbound books in the high schools and elementary schools. The educational market now accounts for 30 per cent of the total paperback sales. Several state and city school systems, such as Texas, New Jersey and New York City, have made studies of the economics and durability of paperbound books in the schools.

Systems of instruction are becoming more prevalent as teachers realize the endless possibilities available today. Whether the schools purchase the materials as a complete package, or select their own component parts, the benefits to the pupil are obvious. A Spanish course kit, for instance, might include a book, filmstrips, motion pictures, tapes and discs for home study. Science editors are planning science kits to accompany the textbooks in two elementary science series. Others offer films and filmstrips to be coordinated with the lessons. Some companies enter into agreements with film companies to produce the material, while others manufacture their own.

Research is in progress on the size, shape and physical components of books, illustrations and overlays. Tests and studies are conducted by a Joint Committee of the Book Manufacturers Institute, the State Textbook Directors Association, the U.S. Testing Company and the Institute, through which manufacturing standards are established.

The use of computers for information storage, retrieval and dissemination is still in the exploratory stage, but may well be an integral part of the classroom of the future. The Institute and the American Book Publishers

Council are jointly sponsoring a study into the impact of computerized instruction on the schools.

Increased use of the library as part of class work is evident. More cooperation between the librarian and the teacher will discover many more interesting ways to teach a subject. If the school library can be geared to provide materials which will complement the classroom instruction, then the pupil's search for knowledge will be more exciting and worthwhile. The classroom library will also play a more important role in the coming years. A shelf of reference works and supplementary reading materials will give the student an immediate source for enlarging his knowledge of a particular area.

Both through UNESCO and the International Publishers Association, American educational publishers have been working with publishers throughout the world to exchange ideas and to determine the best methods in which the developed countries can assist emerging nations in launching an indigenous publishing industry. At the 17th Congress of the IPA in Washington, D. C., this June, the educational publishers organized a division to be concerned solely with educational matters. The prime concern of this group will be to increase the flow of books between nations, and to assist the developing countries in improving their schools and instructional materials. At a second meeting of the educational group in Frankfurt in October, it was decided to establish an information and referral center to provide sources of photographs, illustrations and background materials on various countries and regions of the world. In addition, steps were to be taken to organize technical training programs in the publishing process for teams of authors, publishers and printers from Africa, Asia and Latin America.

As we can see, a great deal has been done, and is being done to investigate the best methods of educating and training our youth. It is, however, only a beginning. I would like to suggest several areas of research from which both educators and publishers at the elementary and secondary level could benefit:

1. A study of the influence of state and district educational policies in limiting the development and accessibility of materials of instruction.

2. A study of school selection procedures to determine what criteria are used and what combination of individuals is involved in the choice of teaching tools.

3. An investigation of who pays for instructional materials and what advantages or disadvantages accrue from providing books free; from a rental plan; or from direct payment by student.

4. A depth study of the turnover cycle to determine for what periods of time materials are adopted and used in the school systems.

5. Research into the educational materials system approach to determine in what way each media contributes to the learning process; i.e., language laboratories, overhead projectors, closed circuit television.

6. Further studies into the physical components of books: print, color, illustrations.

7. Research studies in several curriculum areas:
    a. teaching English as a second language to Puerto Rican, migrant workers, etc.
    b. more definitive description of needs of materials for adult education.
    c. more definitive description of needs of materials for vocational education.
8. Impact of new federal legislation on the accessibility of materials of instruction to the private schools.
9. Study of the impact of urbanization of the country, as well as the changes occurring in the rural-mountain areas as a result of the mechanization of agricultural and mining industries.

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POSSIBLE APPLICATION OF DOCUMENTATION AND INFORMATION RETRIEVAL FOR INSTRUCTIONAL PURPOSES

by

Robert M. Hayes

Introduction

In the development of this paper, my primary concern will be to focus the many projects, covering an extremely broad and diffuse area of work, as they can be made to apply to the specific scope of this conference. To do so, I have defined seven tasks for myself:

1. A definition of "documentation and information retrieval" appropriate to our purposes.
2. A characterization of levels of educational objective.
3. A determination of the relations between these two.
4. The establishment of criteria for utility.
5. A survey of existing research, as it relates to these issues.
6. The establishment of guidelines for evaluating research programs and objectives.
7. Analyzing unmet reserach needs and defining prospective research areas.

The topic is a veritable Pandora's Box. To open it at all is to release a flood, perhaps not of evils, but certainly of unresolved and controversial issues. Not the least of them is the implicit belief that, in some sense, automation will "solve" the problems in instruction, if not in education. Therefore, before treating this subject itself, I must caution against interpreting what I say as an unalloyed espousal of mechanization. In fact, if there is one trend in the field of education which I view with abhorrence, it is the "Skinner Syndrome" in all of its forms, and if nothing else the present love of gadgetry is a direct manifestation of it. I will go even further and state that the whole philosophy implicit in the use of "new media" is part and parcel of this same mechanistic view of education.

This is particularly evident to me in the title of my own talk. Even to consider the "possible applications of information retrieval for instructional purposes" is to equate instruction--and, implicitly, education--with learning of masses of second-hand "information" and "facts." Like Jacques Ellul, in his book on Propaganda: The Formation of Men's Attitudes,[3] I have a great belief in the efficacy of mechanical manipulation--by men as well as by machinery--but I have grave misdoubts concerning the ability of men to resist the effects of manipulation.

For example, the power of the programmed teaching concept to produce conditioned responses is so great that it is indeed an excellent instructional tool. But to what is it conditioning the student? Certainly not only to the particular content being taught. There is just as much--if not more--conditioning to the particular method of teaching involved! If the claim is made that all teaching is simply a process of conditioning response, I probably would agree, just as I might agree to the statement that "all life is simply electricity." But such a simplistic view ignores the facts that we cannot handle inter-personal relations at the level of electrical attraction, and we can neither learn nor teach at the level of conditioned responses.

I must, therefore, caution that the research and developments I will discuss should be evaluated in terms of the subtle and unlooked for side effects which they will create, as well as in terms of their intrinsic advantages.

There is a second prefatory comment to make. It concerns the ill-defined scope of the terms "instructional purposes" and "information retrieval." Each is so diffuse, so subject to different interpretation, as to make communication impossible without very clear definition from the outset of their precise meaning, as I will use them. Yet their use by each person in his own particular way is so ingrained that misinterpretation is almost certain. The approach which I have adopted, therefore, is to consider my first task as the careful delineation of "information retrieval" particularly as related to each of several levels of educational objective. My aim is to establish criteria of utility within which research can be evaluated.

Definitions

Documentation and information retrieval is defined to mean: The substitution of mechanical devices and formalized procedures for human actions in the handling and use of large files of information bearing media.

Communication.--Here we are concerned with the introduction of mechanical devices--such as consoles and typewriters--and formalized procedures such as "stereotypes," subject authorities, and standardized formats into the communication process.

Organization.--Here we are concerned with the introduction of mechanical devices--such as magnetic tape handlers and microfilm reader-printers--and formalized procedures, such as pattern matching and classification, for the organization, location, scanning, and screening of material.

Presentation.--Here we are concerned with the substitution of mechanical devices--such as displays, printers, and computers--and formalized procedures such as report generators, mechanical sorting, statistical analyses, etc., for human analysis and judgment.

To provide a specific framework within which to fit this generalized definition of information retrieval, I want to suggest three illustrations, drawn from the existing research and development:

	Equipment	Procedures
1. The automated classroom:		
Communication	displays and typewriters	stereotyped messages, in the form of programmed textbooks for example
Organization	magnetic tapes, photographic slides, and similar material in mechanized file form; accumulated data on student performance in magnetic form	limited variability, even in the "branching" type of programs, during the instructional process; retrieval for teacher's use--by student, by type of student, by "question," by type of failure, etc.--possibly complex
Presentation	computer, displays, printouts	possibility for student to ask for analyses; certainly for the instructor to do so
2. The mechanized materials center:		
Communication	punched card and punched tape input devices	standardized subject authority (glossary) and request formats
Organization	magnetic tapes, etc. for file indexing; photo files for text, pictures, etc. (possibly microphoto)	description of material in standardized formats, using subject authorities; matching by coordinate matching of Boolean expressions
Presentation	printers, computers, etc.	standardized lists related to syllabus material, selective dissemination, lists in sequence of interest, scheduling for availability
3. Network for continuing education:		
Communication	displays (TV)	on-line "dialogue"
Organization	communication network, switching center, magnetic and photographic files	taped lectures, direct dialogue, matching with files of patient data
Presentation	displays, telephone	teleconference, presentation of statistics

We are concerned, then, with the application of such mechanical devices and formalized procedures for instructional purposes. But, as the examples are intended to point out, what does this mean? Whose purpose? At what level of instruction? and what kind of instruction? Since I cannot reasonably reject any of the alternatives, I must at least organize them.

There are at least four purposes in instruction: fact transfer, skill acquisition, education, and creativity. There seems to be little doubt that mechanization has a valuable and legitimate role to play in the first two, and one can speculate that it does even in the second two. For example, the first illustration--the automated classroom-- has been successfully applied to instruction in assembly line operations and electronic "troubleshooting" at Hughes Aircraft and at General Dynamics, to the learning of the rules of computer programming in SDC's class[9] and the University of Illinois' PLATO project,[8] and to learning Boolean algebra in SDC's class.[9] The experiments with "simulated environments"--such as the experiments at IBM[14] and Oregon[28] and the long-proven use of "management games" in business schools[18]--imply a kind of educational application which may even foster some creative "problem-solving."

Yet, even if we recognize the variety of purposes, particularly as they determine how automated information handling should be used, we are faced with a second issue: Whose purposes? Some systems--most of those concerned with automated classrooms[8-10, 13-15, 18] --are oriented to the student, but usually include a recognition of the value to the teacher in the resulting data on student progress and difficulties. Other systems--such as that planned at Irvine[4]--are more oriented to the needs of the teacher himself in developing programmed instructional material. Still others--those concerned with materials center data processing[19-32]--are specifically designed to aid the librarian, with little interaction between them and the teacher. There are a great many systems (far too many to list) whose aim is to support the management of the enterprise, including the school. The point is that as the same system, perhaps, is viewed by different people, its usage, its organization, its retrieval processes, even its philosophy will be different. For example, the automated classroom may be viewed by the students simply as an interesting means of learning some specific facts, by the teacher as a means of developing an instructional pattern,[4] by the management as a means of handling more students,[9] by a propagandist as a means of fostering conformity.[3]

We must even ask what level of education is involved? The differences between the elementary school student and the practicing medical man are not only exhibited in the level of difficulty of the content. They enter into the size of the data file, the required response time, and the degree of pre-organization possible.

Finally, there is even an issue of educational philosophy. Do we regard education solely as a "conditioning" process, as Skinner so well expounds.[6] Or is our aim to encourage an inquiring mind by raising questions which really cannot be answered? For each, there is a way of using mechanized and formalized techniques, and it is an unresolved question--in my mind, at least--as to whether they are mutually compatible.

Thus, on the one hand we have a set of tools--mechanical devices and formalized procedures--for handling large files, and on the other hand we have a huge, multi-dimensional variety of instructional purposes. It seems that the relation between these two involves three questions: (1) What is the value of large files themselves in each of the instructional purposes? (2) How can information retrieval be applied to each of them? (3) What are the gains and losses in doing so?

We can distinguish three areas in the handling and use of information-bearing media in which studies are being conducted:

To answer these questions, and particularly the third, I would propose a set of criteria for evaluation: economic ones, effectiveness ones, psychological ones, pragmatic ones, and qualitative ones. Among the economic criteria, we can ask whether information retrieval will make the educational process cheaper and whether libraries will be more efficient. Effectiveness criteria relate to response times (the mechanized systems would bring the "library" physically closer to the student and would provide faster access rates), to accuracy (the formalized procedures are executed reliably and in exactly the same way each time, without human error and frailty), to completeness (more material can be made available and can be scanned in reasonable time). Psychological criteria relate to the student's feelings during the instructional process (the impersonal character of the machine allows the student to make mistakes without feeling guilt, and the reinforcement principle provides immediate satisfaction) and the extent to which the student becomes "conditioned" to the method of machine operation itself. Pragmatic criteria relate to the question as to whether, all other issues aside, information retrieval allows us to handle educational needs which, because of their size, couldn't be handled otherwise. Ultimately, we must ask will automation provide a better education? A typical argument is, for example, that it allows the student to move at his own pace, without being either slowed down by others or lost.

Existing Research

The bibliography lists a number of papers and reports concerned specifically with the application of information retrieval in formalized instruction and in school media centers. There is of course an even greater variety of results from the computer and information retrieval fields in general.

What have these studies provided as answers to the questions I have raised? Frankly, they have provided no answers to the first concerning the value of files, but I suppose there is no reason to expect them to do so. That question relates almost solely to the educational process itself. Unfortunately, the whole issue of informational retrieval in education must ultimately be based on the answer to that question.

Almost all of the studies listed have been directly concerned with the second question--how can information retrieval be applied? They have, therefore, been speculative and experimental in character, rather than evaluative. Little would be gained here in reviewing the details of these studies, except as they demonstrate feasibility. Given the three examples (the automated classroom, the mechanized materials center, and the network for continuing education), the methods for the second are well proven; those for the first are still highly experimental; those for the third are completely speculative.

In addition to these evaluations of feasibility, however, we can also derive some answers to the third question, in terms of the criteria for evaluation I have listed.

> Economic criteria:--The economics of the "automated classroom" is still unproven. The results of the PLATO experiment, according to their reports,[8] indicate that one computer renting for about $50,000 per month, can service 500 students at a time, for a cost of $100 per pupil per month. A classroom instructor costing, say, $600 per month, services an average of 20 students (30 per hour, for an average of 6 hours per day,say) for a cost of $30 per pupil per month. The economics of the "mechanized materials center" seems to be well proven, based on the Toronto results.[24, 25] Of course, it implies a degree of centralization for a school system in order to achieve the desired economics. For larger educational networks, such as a network for continuing education, called for in the Heart-Cancer-Stroke Act, there is absolutely no basis for economic evaluation.
>
> Effectiveness Criteria:--There is little question that, in all three examples, the mechanized system will be faster, more accurate, and more complete than present manual ones--at least as far as the recovery and presentation of filed information is concerned. In fact, of course, this is the whole basis of considering it at all.
>
> Psychological Criteria:--These seem to be significant only in the "automated classroom." None of the studies really provide any basis for evaluation. There is much argument made about the positive psychological effects, but as I said earlier I have many misgivings about what the students are being conditioned to accept as a learning process.
>
> Pragmatic Criteria:--There is no data from any of the studies to support any contention that information retrieval would permit us to handle needs which could not be otherwise handled. The situation may be comparable to the use of the computer in scientific computation, for example, where it has permitted the formulation and solution of problems in numerical analysis which could not otherwise be handled, but there is no evidence to support such a comparison. There is some claim that the "network" concept would bring talents to bear on instructional tasks which could not otherwise be used, but again this is sheer speculation.[15]
>
> Quality of Education:--The results of tests of computer programmed learning imply roughly comparable performance by the students who used the computer vs. those who used lectures.[8] The Toronto results definitely imply better availability, scheduling, and use of instructional material and, thus, presumably, better education. There is no data on networks.

In summary, the results to date are at best inconclusive except in the example of the media center. I must, therefore, ask this question: What guidelines should be used to evaluate this literature? And I suggest, as an answer, three of them:

1. Is it enamoured with gadgetry? If so, the results are almost certainly of value only in demonstrating feasibility.
2. Is it speculative, experimental, or operational? All have value, but the nature of the results will be quite different.
3. Is there an analytical base for generalizing the results?

Needed Research

This can best be described by a set of questions:

Usage

1. What response times are needed for the various categories of instructional needs and users?
2. What are criteria for content evaluation?
3. What are the needs in terms of precision, accuracy, and reliability?
4. What are the best forms for presentation?
5. What is the extent of conditioning involved in the use of mechanized retrieval systems?

Operation and Organization

1. What kind of system vocabulary or subject authority is called for?
2 What kinds of file organization?
3. What stereotypes for communication?
4. What kinds of programs:
5. What kind of administrative organizations?

Equipment

1. What are comparative features of different equipment configurations?
2. What degree of multiplexing, on-time, inter-active action?
3. What data rates? (One input every four seconds each a single character, but no indication of amount in the display)
4. What are the "human engineering" aspects?

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RECAPITULATION OF RECOMMENDATIONS

by

Irlene Roemer Stephens

The recommendations set forth by the participants have been reviewed within the framework of the organization of the Conference. Broad in some instances and quite specific in others, the restated recommendations constitute the qualified judgments of the specialists in the field of the use of printed and audio-visual materials for instructional purposes. The conspectus of recommendations, presented as a prelude to the present volume, represents a coordination and an integration of the recommendations recapitulated in the present chapter.

Use of Printed and Audiovisual Materials for Instructional Purposes at Various Levels of Education

Elementary School

1. Assuming no requirement for eliciting support for the potentialities of the newer media for instructional purposes, it is recommended that research be initiated to identify the educational possibilities for these newer media. This research should involve both speculation and experimentation and extend to the exploration of potential value and the search for political and economic understanding, while seeking better warranted assertions about the theoretical tools of understanding the dynamics of educational change.

2. It is recommended that research be conducted in search of design principles for educational programs involving a bringing together of many environmental factors (including aesthetic, moral and political dimensions, as well as technological aspects of education), in order to construct an educational environment.

3. Research in the field should be planned with a cognizance that the educational process involves the participation of the producers of educational materials as well as the teachers in the school organization.

Secondary school

4. Involvement of the media specialists with the educator in the materials and media revolution in the schools is advised.

5. Research should be directed toward devising new strategies by which media specialists of media-oriented organizations can become involved with educators for the development of materials and instructional media and systems for their utilization and evaluation.

6. Access to research findings, with interpretation of applications to secondary school education, should be provided. Attention should be directed toward the dissemination and implementation of innovation and research findings. National leadership should be assembled to identify, sort and highlight the significant research.

7. Research demonstration centers should be established to implement the development of experience with the problems and insights of putting theories and innovations to work. Included should be consideration of "teacher roles," "librarian roles," "paraprofessional roles" and "logician roles." Research demonstration centers should be a joint venture of government, business-industry, and professional education, including media specialists.

8. Systematic research should be conducted to determine how to communicate a "feeling for" the medium and its materials.

9. Additional research should be directed toward the age/stage differences among young and older children and adults with reference to the use of materials and media.

10. A diagnostic test should be developed by which educators can help judge their own readiness, receptivity and compatibility with the various media, materials and the assumptions about learners, learning, content organization, motivations and instructional system built into the materials.

11. It is recommended that projects involve interdisciplinary planning and management so that the thrusts of the various groups of specialists will be more efficient, more orchestral and more truly innovative in the improvement of instruction for human living.

12. It is recommended that research be conducted on the use of a new cluster of diagnostic and self-managed materials and equipment, including computer-based instruction, with emphasis on behavioral objectives in which the standard of performance is held constant and the time is varied.

College and University

13. It is recommended that a study be conducted to determine the role of mass media in education at the college and university levels. The study should be designed to determine the extent of exposure of students to the various media both in direct relationship to curricular studies and in relation to extracurricular interests.

14. A study should be made to investigate the communication flow to students from teachers, textbooks, mass media and other students.

15. The patterns of use of materials at various levels of instruction should be investigated with the end-in-view of determining changes in these patterns from high school, to college, to post-college study. Differentiation should be made between types of communities and colleges, i.e., small town areas and community colleges; Midwestern towns and state universities with students from the respective states; large urban areas and city colleges; large Ivy League type colleges and commuter students, and small colleges with "tradition" of reading (such as Swarthmore).

16. It is recommended that research studies be conducted to determine the use of textbooks in colleges and universities including consideration of the number of texts, the use of paperbacks, circumstances where no texts are used, and the extent to which assignments are geared to library use.

17. Research is recommended to determine the use of the library by graduate students, faculty and research workers to discover the working habits of users.

18. Research is suggested to determine the extent to which colleges and universities provide audiovisual materials and equipment, and to what extent and under what circumstances these materials are used.

19. It is recommended that library schools conduct research on the use of materials.

Types of Materials Used for Instructional Purposes

General Books, Textbooks, Encyclopedias and Bibliographies

20. In view of the change in urban/rural population distribution, it is recommended that a study be conducted to determine whether there has been an increase in demand for state library and extension services and to identify the scope and effectiveness of the non-local library service.

21. Research to determine to what extent regional depositories can serve whose needs for what purposes and with what effectiveness, is recommended.

22. Recommendation is made for an investigation of how effectively bookmobiles perform what services to whom in areas where no other library services or other book outlets exist.

23. It is recommended that the holdings of public and school libraries in the same geographical area be examined to determine the extent of duplication and/or uniqueness in holdings.

24. It is recommended that new investigations be directed toward determining what kind of student reads what type of books, periodicals, etc., and where do these students get these materials.

25. Studies to provide insights into the use of materials by advanced students are recommended in order to contribute to the solution of problems of storage arrangement and availability of research library holdings.

26. Studies are recommended to determine to what extent significant books are available in public and college libraries.

27. It is recommended that studies be made of the effect of paperbacks on library acquisition and use.

28. Recommendation is made for a study to determine how effective regional networks have been in supplying books in relatively little demand, to discover whether the character of use has changed as a result of the system, and to determine to what extent the resources of the stronger collections are used.

Reference Books

29. Status research on the *use of reference books* is recommended to include determination of present practice.

30. Studies are recommended for the identification of *what materials of instruction are available to teach reference skills*, what schemes or devices are available for evaluating the outcomes of instruction in reference skills, and what attitudes exist toward instruction in reference skills.

31. It is recommended that studies be made of the *abilities of children in the use of reference materials*.

32. It is recommended that studies be planned to determine what characterizes the *reference behavior of children* at different developmental levels and under varying conditions.

33. Studies in *measurement and evaluation* of what children do with a reference task are suggested to provide background for the development of adequate instruments and devices.

Periodicals, Newspapers, and Other Serials, Documents, Technical Reports and Pamphlets

34. It is recommended that further study of the various types of *materials* focus not on their use but on their *comparative usefulness for communicating ideas*.

35. Recommendation is made for research directed toward the investigation of the *relationship between teaching objectives and the experiences students* have as a result of the use of materials.

36. Developmental research aimed at discovering when and how the student *of* science becomes a student *in* science is recommended.

Audiovisual Materials

37. Research should be directed toward discovery of the unique *educational characteristics of each of the media of instruction* and their particular contributions to the enhancement of *learning* of different types.

38. It is recommended that the *effects of using combinations of several kinds of educational media* over prolonged periods of time, with different kinds of learners, and with varying subject matter being investigated.

39. The conduct of studies to determine *audience-learner characteristics*, and their *relationship to learning* through the use of the new educational media, is recommended.

40. Research is recommended to determine the effect on learning if a classroom environment were established which provided all the equipment and learning materials needed for both group and individual study. This study should be extended to determine the optimum amount of equipment and materials for each classroom and for each school.

41. Investigation should be directed toward determination of the effects on learning of still pictures, slides, and filmstrips readily accessible to the teacher at little cost.

42. Research is recommended to assess the consequences of large group use of films, television, videotape recordings, and multi-media presentations over a prolonged period of time in reference to learning, discipline problems, the slow learner, the superior student, the teachers, the attitudes toward education and learning, and administrative practices. The study should extend to investigation of the importance of the immediate environment of the learner's own classroom as compared with learning in an auditorium or lecture hall.

43. Investigation is recommended to determine what would be the effects of using these media as "total" teaching instruments under certain conditions and for certain phases of instruction. The investigation would extend to determination of whether or not there are some teaching objectives or kinds of subject matter which would be more effectively taught in this way.

44. Studies are recommended to determine how the productivity of the teacher is increased (if at all) with the use of newer educational media.

45. Research should be conducted using complete instructional materials packages containing a variety of materials designed to teach the content. The study should involve considerations aimed at determining the proper mix for such packages.

46. Research is recommended to identify the factors responsible for effective audiovisual teaching. Questions to be answered should include: To what extent do they depend upon the characteristics of the educational media themselves? Upon the way the materials are used in instruction? Upon the characteristics of the learners with whom the material is used?

47. Studies are recommended to investigate the reasons why in-service teachers don't use the audio-visual materials that are available to them, what the deterrents to optimum use are, and what factors lead to increased and appropriate use.

48. Research is recommended to determine the effect of different kinds of supervisory techniques and programs on the ways teachers use the newer media.

49. Studies should be initiated to consider the attitudes of teachers and school administrators toward the newer media and to determine to what degree fear of being replaced by a machine affects the attitudes that teachers have.

50. It is recommended that research be designed to answer the following question: What effect does the way teachers are taught during their pre-service teacher education programs (other than in audio-visual techniques) have upon their subsequent use of newer media in their classrooms?

51. Full-scale studies are recommended (involving team curriculum specialists in the various subject matter areas with specialists in the newer educational media and with textbook specialists) to examine the instructional requirements of the area.

52. Studies are recommended to identify the basic elements of learning from pictures, both still and motion, to determine whether there is a set of unified principles for learning from visual material of all kinds.

53. The following questions should be investigated: How do we develop a "visual literacy" in learners? What and how should they be taught in order to learn how to "read" moving and still pictures and television most fluently and with meaning?

54. Research should be conducted to determine the relationship between "interest" in material and learning from that material.

55. Further study is recommended of production, or "message design," variables with all kinds of media.

56. It is one thing to isolate certain variables under laboratory conditions, yet quite another to get them incorporated by commercial producers and textbook publishers into the media themselves. A study is recommended to determine how this process may be facilitated.

57. Developmental research on new kinds of equipment is recommended.

58. Experimental research on the assumed advantages and disadvantages of the new educational media is recommended.

59. Research is recommended on the application of the computer to the solution of problems related to the utilization, production, and administration of new educational media.

60. Studies are recommended to determine the best arrangement for administering audio-visual materials. Among the considerations should be library structure, centralization vs. decentralization; learning resource center; standards for equipment and physical facilities; procedures for evaluating and selecting instructional materials; cataloging procedures; budgeting procedures; and distribution procedures.

Exhibits, Models and Other Graphics

61. It is recommended that a study be conducted to determine the effect of the use of exhibits and models for instructional purposes.

62. It is recommended that the effect of student tours on learning be investigated.

Motion Pictures

63. Studies should be conducted to determine how best to buy, store and make films available.

64. Investigation should be directed toward determining how to stimulate discovery of new film forms and new film types.

65. It is recommended that the nature of film literacy be investigated.

66. Effort should be directed toward determining what guidelines or criteria can be used in deciding how best to use the school dollar with respect to educational film.

67. Research is recommended to determine what media should be used for what purpose.

68. Studies should be made to determine what utilization practices should be used with cartridge-8.

69. Research is recommended to determine how best to enhance learning through film.

70. The use of the rear-screen projector should be investigated to determine how it should be used to encourage the most active learner participation.

Interaction of Other Media with Conventional Book Use

71. Research for the development of tests to ascertain differences in perception between teachers and pupils is recommended.

72. Recommendation is made for research to determine through which senses the individual achieves the greatest awareness of an experience.

73. A study is recommended to determine the "television literacy" of drop outs.

74. It is recommended that research be directed toward the development of a test to study the relative efficacy of speech on radio, television, telephone and lecture platform to give insight into the efficacy of the various communication methods in teaching different subjects.

75. It is recommended that a test be devised to study the impact of the printed word in the electronic world. The "advertising literacy" or impact of type distortion should be ascertained as compared to the usual typography.

Instruction in the Use of the Library and Library Use by Students

76. It is recommended that consideration be immediately directed toward the development of theory and opportunities for the exchange of ideas and for critical exploration which is essentially contemplative in nature, and which involve specialists in many disciplines.

77. It is recommended that a series of service studies be instituted that would evaluate on-going developments in the use of the library and library use by students and synthesize findings.

78. It is recommended that further attention be directed toward analysis of curricular content, the design of the study extending to the analysis of specific assignments as an approach to the evaluation of instructional methods; appraisal of the relationship of curricular content to educational objectives; determination of the extent of textbook-dominated teaching; for location of questionable assignments, for determination of the scope and variety of experiences in independent study provided for students; assessment of student work loads; and evaluation of the adequacy of library resources.

79. Recommendation is made for studies involving the analysis of assignments in relation to library instruction to determine, in particular, the extent to which students are motivated by class assignments to use library resources; the kinds of uses of library resources the assignments motivate; the types of knowledge and the skills which students require for effective use of library resources in the completion of assignments; and the breadth and depth of library experiences thus provided.

80. It is recommended that control studies, case studies, demonstrations, systematic observations and normative surveys be conducted in the area of library instruction at the elementary and secondary levels of education. These studies should be so designed that it will be possible to obtain evidence concerning: (a) the relative effectiveness of the various methods of instruction--integrated lessons, separate or self-contained units of instruction, or a combination of both; (b) the use and effectiveness of programmed materials; (c) the use and effectiveness of closed circuit and educational television; (d) what the nature and extent of the librarians' participation should be in guiding study skills and work methods in functional programs; and (e) optimum size for large and small group instruction.

81. A normative survey of courses offered on the literature of the various subject fields at colleges and universities is recommended. This survey should include analysis of course content, location of these courses in terms of the disciplines in which they are incorporated and the college year in which the students usually take them.

82. In view of recent curricular and instructional developments in the schools, research on tests and measurements to be used in areas of library use and library resources would appear to be in order, except that the philosophic inquiry involving the integrated judgments of

specialists (Recommendation 76) resulted in the conviction that performance in regular class assignments might furnish all the evidence needed about students' capabilities and performance in the use of libraries and library resources. Should further inquiry be deemed essential, it is recommended that investigation include the following: (a) a critical examination and evaluation of available tests; (b) the identification and evaluation of locally constructed tests not available on the general market; (c) the construction and standardization of any needed new tests including tests involving actual usage rather than conforming to the prevalent pencil-and-paper type of test; (d) an appraisal of the values and reliability of programmed materials as testing measures; (e) appraisal of the validity of scores made on library instruction tests as indicators of success in other areas of learning, either potential or actual; (f) studies of correlations between scores made on these tests and academic achievement; and (g) examination of causal factors that might affect high-score performance and low scores.

83. Philosophic inquiry, involving the pooling of judgments of specialists is recommended in the area of the nature and scope of library services in relation to library instruction. The systematic pursuit of discussion revolving about the question of determining just how much service should be provided to students in locating library materials, and the integration of the critical judgments of leaders in the field contributing to this discussion might well provide new orientation and direction to future programs of library service and instruction in the use of the library and library resources. Just how much knowledge a student should be expected to have of library resources and how much facility in procedures for the effective use of the library materials remains open to question.

84. Recommendation is made for the establishment of information control and bibliographic control in support of effective communication among those working in the field. The establishment of adequate bibliographic control of information in the field is essential not only to the effective transmission of information, but the avoidance of unnecessary duplication of effort.

85. It is recommended that a network of regional materials centers be established. The centers should be staffed with specialists, one of whose responsibilities should be the development of system analysis of materials for teachers, as well as for students. The development of system analysis of materials for children and young people is particularly needed. Another function of the regional materials centers should be computer storage and retrieval of information on content of materials. This computer-stored information resulting from content analysis of materials should be made easily accessible to teachers and, when necessary, to students.

86. The institution of demonstration projects of outstanding programs on libraries is recommended. These programs should be open to visits by librarians, teachers and others.

87. Programs demonstrating the effective use of materials of all types and involving different age groups are recommended. The presentation of these demonstration programs might be designated as one of the functions of the regional and local centers.

88. It is recommended that experimentation of an action research type, in areas of library instruction and library use, be instituted in schools and elsewhere.

89. It is recommended that systematic research and investigation be planned and expedited in the development of educational materials of all types.

90. Accessibility studies are recommended to explore and demonstrate (a) the functional arrangement of materials within single elementary and secondary schools, resources centers, learning areas and "little" libraries arranged on subject or grade level basis, etc.; (b) the classification and arrangement of printed and audiovisual materials, involving experimentation with intermixing of the various media.

91. Studies are recommended to determine the effects of keeping school libraries open longer hours, the patterns of use of libraries during these hours and the effect of hours of opening on cooperative school library service.

92. Barriers to the expeditious transition of school libraries into integrated, comprehensive and functional material centers should be identified.

93. Evaluation and critical appraisal of elementary school library development in relation to services provided in childrens' departments of public libraries is recommended.

94. Studies are recommended of the cost of duplicating titles and materials for student use as they affect standards for recommended expenditures for libraries. The question of whether it is less expensive to give students paperbacks rather than duplicating and processing materials for the library collection should be resolved.

95. Studies are recommended to collect objective data to be used in formulating standards to provide guidance regarding the type, number and handling of audiovisual materials to be provided by libraries

96. Use studies to yield data relating to the nature, content and methodology of library instruction are recommended and should include: (a) studies of general patterns of library use to determine what materials are used, for what purposes by students at various levels of academic achievement, reading abilities, and intelligence, and with what backgrounds; from where are materials obtained and why; what questions are asked; and what reasons are involved in the use or non-use of different media; (b) studies of the relative effectiveness of different media used by students both for academic and non-academic purposes; (c) critiques, supported by evidence that would directly confront the problem of the imminence of the return to and supremacy of textbook dominated teaching

as a result of the pressures, images, symbols and attitudes created by the college board and other examinations that determine selection of students for colleges and universities; (d) studies of the use made by students of specific tools; (e) comparative studies that would test the relative effectiveness of those classification schemes which have departed from traditional forms; and (f) experimentation with new subject headings for students in elementary and secondary schools.

Educational Publishing

The Use of Trade Books, Children's Books and Paperbounds as Instructional Media

97. It is recommended that research be instituted to investigate the practical obstacles to the use of general books as educational media. The study should consider legal and administrative barriers to the purchase and provision to students of paperbound books; purchasing practices of school districts and factors influencing these practices; mechanisms for selection of library books and paperbounds as compared to those for textbooks; and should identify and describe school library book-selection practices; should identify sources of information used in selection differentiated by grade level and subject; should identify areas where additional bibliographies and review services are needed; and should determine and evaluate the opportunities provided for teachers and librarians to examine new general books and paperbounds; and should identify needs for examination centers to be established by state or metropolitan school systems or teachers' colleges.

98. Research is recommended to determine the present patterns and trends of school and college use of public libraries. To be identified are present practices of cooperation, the financial assistance provided to public libraries in support of these practices and, finally, to identify need for additional support.

99. Research in the area of censorship is recommended, directed specifically toward determining practices which have been used to avoid or suppress public reaction against the use of school-selected reading materials the content of which is potentially controversial. The study should extend to determining to what extent fear of controversy has affected selection practices.

100. Research on the psychology of reading motivation and its relation to the use of general books in the schools is recommended. The development of lifetime reading habits, as distinguished from the development of reading skills, should be considered.

101. Research should be conducted to establish methods of using media especially broadcast media, to stimulate general reading.

Implications of Curriculum Trends, Methodology and Content for Educational Publishing

102. A study is recommended of the influence of state and district educational policies in limiting the development and accessibility of materials of instruction.

103. School selection procedures should be studied to determine who selects teaching tools and what criteria of selection are used.

104. A financial study is recommended to include an investigation of sources of funds for purchase of instructional materials. The study should extend to consideration of advantages and disadvantages of providing free books, of using rental plans and of requiring students to purchase or rent books themselves.

105. A study in depth of the turnover cycle of books in school systems is recommended.

106. Research to investigate the educational materials system approach is recommended in order to determine in what way each medium contributes to the learning process. Particular attention should be directed toward language laboratories, overhead projectors and closed circuit television.

107. Further studies are recommended on the physical components of books, including print, color and illustrations.

108. Recommendation is made for research studies designed to determine and describe the types of materials most effectively used for instructional purposes in the following areas: (a) teaching of English to groups whose first language is Spanish; (b) adult education; (c) vocational education.

109. Studies are recommended on the impact of new Federal legislation on the accessibility of materials of instruction to private schools.

Possible Application of Documentation and Information Retrieval for Instructional Purposes

110. It is recommended that research be instituted to answer the following questions relating to usage of mechanical devices for instructional purposes: (a) What response times are needed for the various categories of instructional needs and users? (b) What are criteria for content evaluation? (c) What are the needs in terms of precision, accuracy, and reliability? (d) What are the best forms for presentation? (e) What is the extent of conditioning involved in the use of mechanized retrieval systems?

111. In the organization and operation of mechanized retrieval systems for instructional purposes, research is recommended to determine the kind

of system vocabulary or subject authority required, the file organization preferred, the stereotypes most effectively used for communication, the programs to be used and the administrative organization required.

112. Research on equipment for mechanized retrieval systems to be applied for instructional purposes is recommended to determine comparative features of different equipment configurations; degree of multiplexing, on-time, interactive action; data rates required; and to investigate and describe the "human engineering" aspects.

APPENDIX

CONFERENCE ON THE USE OF PRINTED AND AUDIO-VISUAL MATERIALS FOR INSTRUCTIONAL PURPOSES

CONFERENCE ON THE USE OF PRINTED AND AUDIO-VISUAL MATERIALS FOR INSTRUCTIONAL PURPOSES

November 22-23, 1965

Butler Library
Columbia University

MONDAY, NOVEMBER 22

9:00 AM	REGISTRATION	Butler Library, Room 523
9:30 AM	OPENING SESSION	Butler Library, Room 522
	INTRODUCTORY REMARKS	Maurice F. Tauber Professor, School of Library Service Columbia University

USE OF PRINTED AND AUDIO-VISUAL MATERIALS FOR INSTRUCTIONAL PURPOSES AT VARIOUS LEVELS OF EDUCATION

10:00 AM	1. ELEMENTARY SCHOOL	Dwayne E. Huebner Associate Professor of Education Teachers College Columbia University
10:20 AM	2. SECONDARY SCHOOL	Phil C. Lange Professor of Education Teachers College Columbia University
10:40 AM	3. COLLEGE AND UNIVERSITY	Richard D. Chapin Director of Libraries Michigan State University

TYPES OF MATERIALS USED FOR INSTRUCTIONAL PURPOSES

11:00 AM	4. GENERAL BOOKS, TEXTBOOKS, ENCYCLOPEDIAS, AND BIBLIOGRAPHIES	Leon Carnovsky Professor of Library Science Graduate Library School University of Chicago
11:20 AM	5. REFERENCE BOOKS	J. Harlan Shores Professor of Education University of Illinois
11:40 AM	DISCUSSION	

Reconvene at 1:55 PM

TYPES OF MATERIALS USED FOR INSTRUCTIONAL PURPOSES (cont.)

2:00 PM	6. PERIODICALS, NEWSPAPERS, PAMPHLETS, ETC.	Patricia B. Knapp Director, Monteith College Project Wayne State University
2:20 PM	7. AUDIO-VISUAL MATERIALS	William H. Allen Director of Research Department of Cinema Research Division University of Southern California
2:40 PM	8. EXHIBITS, MODELS, AND OTHER GRAPHIC MATERIALS	William D. Boutwell Editorial Vice-President Scholastic Magazines
3:00 PM	9. MOTION PICTURES	Louis Forsdale Professor of Education Teachers College Columbia University
3:20 PM	DISCUSSION	

TUESDAY, NOVEMBER 23

TYPES OF MATERIALS USED FOR INSTRUCTIONAL PURPOSES (cont.)

9:00 AM	10. INTERACTION OF OTHER MEDIA WITH CONVENTIONAL BOOK USE	Harley Parker Director Royal Ontario Museum Toronto, Canada
9:20 AM	11. INSTRUCTION IN THE USE OF THE LIBRARY AND LIBRARY USE BY STUDENTS	Frances E. Henne Professor of Library Service Columbia University
9:40 AM	12. CURRICULUM; TEACHING METHODOLOGY; CHANGING METHODS IN EDUCATIONAL PUBLISHING	Dan Lacy Director, American Publishers Council Austin J. McCaffrey Executive Director American Textbook Publishers Institute
10:00 AM	13. POSSIBLE APPLICATION OF DOCUMENTATION AND INFORMATION RETRIEVAL FOR INSTRUCTIONAL PURPOSES	Robert M. Hayes Professor, School of Library Service University of California, Los Angeles
10:20 AM	DISCUSSION	

Reconvene at 1:45 PM

2:00 PM SUMMARY AND CONCLUSIONS

14. USE OF PRINTED AND AUDIO-VISUAL MATERIALS AT VARIOUS LEVELS OF EDUCATION
    a. Present research
    b. Program for future research

15. TYPES OF MATERIALS USED FOR INSTRUCTIONAL PURPOSES
    a. Present research
    b. Program for future research

16. USE OF THE LIBRARY AND LIBRARY MATERIALS IN RELATION TO VARIOUS FACTORS
    a. Present research
    b. Program for future research

APPENDIX B

PLAN OF OPERATION DATED MARCH 10, 1965, FOR "A CONFERENCE FOR THE PURPOSE OF DESCRIBING PRESENT RESEARCH AND OUTLINING A PROGRAM OF RESEARCH ON THE INSTRUCTIONAL USES OF PRINTED MATERIALS AND AUDIO-VISUAL MATERIALS."

STATEMENT OF THE PROBLEM:

With the present growth in national population, and the consequent expansion of educational institutions on all levels with widely diversified programs of instruction, it has become increasingly apparent that there is a vital need to assess the present uses of printed materials used for instructional purposes in educational institutions.

The present proposal is for a conference, to include knowledgeable experts in the fields of publishing, education, psychology, and librarianship, to discuss available information on the present status of the instructional uses of printed materials and audio-visual materials (films, recordings, maps, music, etc.).

The Conference would consist of two major parts:

(1.) the presentation of working papers on research in the field by individuals qualified to evaluate such research; and

(2.) the presentation of a program for future research projects on the use of printed materials and audio-visual materials for instructional purposes.

OBJECTIVES:

(1.) To isolate present information on the use of printed materials and audio-visual library materials for instructional purposes.

(2.) To evaluate studies in this field in regard to methodology.

(3.) To consider methods of examination and criteria for the evaluation of projects on the instructional use of printed materials and audio-visual materials.

(4.) To outline a program of research, with relevant detail, for the field.

CONFERENCE PLAN:

For maximum effectiveness, it is proposed that the Conference be restricted in size and include only the participants. The Conference, therefore, would not be an open-discussion meeting.

It would be expected that each participant prepare a working paper on some assigned aspect of the general topic and identify it carefully on bibliographical and content bases. These papers would be prepared and circulated to participants in advance of the conference and would serve as the basis for discussion at the conference itself. Authors would have an opportunity to revise their papers as a result of the conference before submitting them for inclusion in the final report.

CONFERENCE PROGRAM:

Although the final conference program cannot be fully delineated at this time it is expected that the following topics will be included:

1. Research in the Design and Format of Printed Materials in the Future.
    a. Influence of programed instruction.
    b. Relationship of printed materials to pictorial and other types of materials.
    c. Identification of topics for further research.
2. Use of Printed Materials by Students.
    a. Relevant research from psychology, library science, media, etc.
    b. Areas for further study.
3. Administrative Arrangements that can Support Effective Instruction Using Printed and Other Materials.
    a. Distribution practices.
    b. New formats (paperbacks, programed texts, etc.).
    c. Areas requiring further study (personnel requirements, buildings, etc.).
4. Possible Application of Documentation and Information Retrieval Approaches.
    a. Developments that affect access to printed and other materials.
    b. Areas and topics for further research.

PARTICIPATION:

Participation in the conference will be limited to ten to twelve highly knowledgeable people selected from the fields of publishing, research, education, psychology and librarianship. The names of the participants together with the conference program will be submitted to the Media Research and Dissemination Branch at least twenty days prior to the conference date.

TIME SCHEDULE:

Phase I - 4 months. Arrange details of conference, develop conference program, select participants, arrange for preparation, duplication and exchange of papers.

Phase II - 1 month. Hold conference, edit and revise papers as necessary, prepare an outline of the final report.

Phase III - 2 months. Preparation, editing and duplication of final report. 225 copies of this report will be delivered to the Media Research and Dissemination Branch, Office of Education.

END-PRODUCT:

A final report containing the papers prepared by the conference participants, a summary of the conference proceedings and the recommendations of the conference regarding needed research in the use of printed materials and the newer media.